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ABSTRACT

This document, volume two of a two-volume project report describing a two-year study conducted to develop an individualized curriculum delivery system for competency-based vocational education, contains the following materials related to the project: a dissemination of framework paper; a schedule of conferences and workshops attended by the project staff; all the inventories, questionnaires, and surveys used to collect the data; and the texts of several papers either presented at the conferences or submitted for periodical publication. (BM)

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Final Report - Volume II

Project No. V0155VZ
Grant No. OEG-0-74-1645

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Tallahassee, Florida 32304

DEVELOPMENT OF A CURRICULUM DELIVERY SYSTEM FOR INDIVIDUALIZING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION

June 1976

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APPENDIX A

INDIVIDUALIZING INSTRUCTION FOR COMPETENCY-BASED EDUCATION

(See Framework Paper attached at end of Report)

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APPENDIX B

DISSEMINATION OF FRAMEWORK PAPER

APPENDIX B

DISSEMINATION OF FRAMEWORK PAPER

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APPENDIX C

CONFERENCES AND WORKSHOPS ATTENDED BY STAFF OF CDS PROJECT

APPENDIX C

Conferences and Workshops Attended by Staff of CDS Project

1. National Vocational Educational Research Conference, Washington, D.C., October 23-November 3, 1974.
2. American Vocational Association Conference, New Orleans, LA., December 5-11, 1974.
3. IMTS Teacher Training Workshop, Lake City, FL., January 2, 1975.
4. ISD Workshop, San Diego Naval Base, February 10-13, 1975.
5. Association for Supervision and Curriculum Development Convention, New Orleans, LA., March 14-19, 1975.
6. American Educational Research Association Convention, Washington, D.C., March 30-April 3, 1975.
7. Florida Vocational Educators Conference, Orlando, FL., August 4-8, 1975.
8. Conduct Teacher Training Workshop for Fieldtest Teachers, Tampa, FL., August 18-20, 1975.
9. American Psychological Association Convention, Chicago, Ill., August 29-September 4, 1975.
10. Part C Project Directors Conference, Atlanta, GA., October 22-24, 1975.
11. Conduct Teacher Training Workshop for Fieldtest Teachers, Tampa, FL., October 24-25, 1975.
12. Conduct Teacher Training Workshop for Fieldtest Teachers, Tampa, FL., December 6-7, 1975.
13. American Vocational Association Convention, Anaheim, CA., December 7-10, 1975.
14. American Educational Research Association Workshop, Clearwater, January 8, 1976.
15. Florida Educational Research Association Conference, Orlando, FL., January 28-30, 1976.
16. RCU Conference, Orlando, FL., March 21-23, 1976.
17. Lake County Schools Workshop, Eustis, FL., April 15-16, 1976.
18. American Educational Research Association Convention, San Francisco, CA., April 18-23, 1976.

Conferences and Workshops Attended
by Staff of CDS Project

19. EPSA Conference, Lexington, Kentucky, April 20-21, 1976.

20. Hamilton County Teacher Training Workshop, Jasper, FL., June 7-8, 1976.

21. Conduct Teacher Training Workshop for Fieldtest Teachers, Tampa, FL., March 27-28, 1976.

APPENDIX D

TEACHER ATTITUDE INVENTORY

TEACHER ATTITUDE INVENTORY
(Revised)

Directions: Circle the response in the right hand column that best reflects your attitude on each question.

Use: SA - Strongly Agree
A - Agree
D - Disagree
SD - Strongly Agree

1. The teacher can make better use of class time if all students work together. SA A D SD

2. A teacher can always find one best textbook for the students in the class. SA A D SD

3. All students should start a course at the same time. SA A D SD

4. In order that they can spend more time in areas where they need it, students should not be bound by fixed class schedules. SA A D SD

5. Even though the content is the same, one set of instructional materials may interest a student more than another set. SA A D SD

6. In any course, all students should have the same content. SA A D SD

7. All students in the class should listen to the teacher's lectures. SA A D SD

8. There should be more and better learning taking place when all of the students in a class use the same text. SA A D SD

9. The teacher should set the primary objectives for the class. SA A D SD

10. Students should always proceed at their own pace. SA A D SD

11. Students should have a variety of instructional materials to select from. SA A D SD

12. Students should study that content which best meets their own needs and interests. SA A D SD

13. A student should take a test when he is ready for it. SA A D SD

14. If a good selection of textbooks is available to the students, it is not necessary to provide them with instructional materials based on other media. SA A D SD

15. Each student should have his own objectives toward which he can work. SA A D SD

16. Even when working hard, some students need more time than others to complete their work. SA A D SD

17. An important part of individualizing materials is individualizing tests. SA A D SD

18. To determine quality of performance, each student's performance should be compared to the performance of his fellow students. SA A D SD

19. A teacher should not be expected to work with a class where all of the students are working at their own rates. SA A D SD

20. All students in a class should take the same tests so that the teacher can compare the grades. SA A D SD

21. Because competition promotes achievement, all students should be working toward the same objectives. SA A D SD

22. Students will tend to become lazy if they are allowed to work at their own pace. SA A D SD

23. The individualization of materials should include selecting the media which best suit the student. SA A D SD

24. The teacher should establish minimum standards for the whole class. SA A D SD

25. Because of their training, teachers know what are the best rates of study for the students. SA A D SD

26. Materials should be determined by the individual's needs. SA A D SD

27. Even in individualized instruction, all of the students in a given class should be studying the same content. SA A D SD

28. It is not necessary that all of the students in a class be the same age. SA A D SD

29. All students should start and end a unit using the same materials. SA A D SD

30. The teacher should be sure that all students receive the basics in a subject. SA A D SD

APPENDIX E

OPINION QUESTIONNAIRE

Opinion Questionnaire

Background Information:

1. Social Security Number ______________________
2. Male/Female (circle one)
3. Major Field of Study ______________________
4. Class ______________________ (Junior, Senior)
5. Age ______________________
6. Number of Methods courses in Education ____________

Directions: Circle the response in the right hand column that best reflects your attitude on each question.

Use: SA - Strongly Agree
A - Agree
D - Disagree
SD - Strongly Disagree

1. If a course is well-designed, it should enable all students to begin together, proceed through the instruction as a group at the same rate, and complete the course at the same time. SA A D SD
2. If a class includes slow, average, and fast learners, the best approach for the teacher is to teach on the level of the average student. SA A D SD
3. Good teachers spend more time trying to motivate individual students than trying to convey content information to a class. SA A D SD
4. By far the most important skills for teachers are being able to diagnose individual student needs and to prescribe appropriate instruction based on their diagnoses. SA A D SD
5. A good teacher spends most of his instructional time in the classroom working with individual students. SA A D SD

6. When two students are doing the same lesson, it is unfair to give one student more time to complete the lesson than is given to the other student. SA A D SD

7. Giving students lots of different media to choose from in a course is wasteful and unnecessary. SA A D SD

8. Instructional materials should be provided in whatever media are appropriate to the learning styles of the students. SA A D SD

9. Learning is more efficient if all students in a class use the same materials and study the same lessons. SA A D SD

10. The teacher is more a manager of learning resources than a source of subject matter information. SA A D SD

11. An important reason for deciding what to teach and how to teach it is the need of the individual student. SA A D SD

12. A good teacher attempts to use the same approach to instruction with all students. SA A D SD

13. Instruction ought to be adjusted, or changed, as frequently as necessary to meet the individual needs of students. SA A D SD

14. An instructional program is not well-designed unless every student has a set of objectives and learning activities selected especially for him. SA A D SD

15. No student should be given a unit of instruction unless he has first been tested to find out whether the instruction is necessary for him. SA A D SD

APPENDIX F

TEACHER QUESTIONNAIRE
PARTS I, II, AND III

Teacher Questionnaire, Part I

Dear Instructor:

There is currently a statewide effort underway in Florida to improve the services and resources available to vocational teachers. As part of this effort, this questionnaire has been designed to gather information necessary for assessing the future training needs of Florida's vocational teachers.

As a vocational instructor, your assistance in this effort is extremely important. In the questions which follow, you are asked for information on your background, professional training, and experience. You are also asked to make some recommendations regarding your colleagues. All of the information you provide will be kept in confidence and will be used only for the purposes stated above.

Please answer all of the questions as accurately and completely as possible, using either pencil or pen. When you have completed the questionnaire, please return it in the stamped, pre-addressed envelope which has been provided.

A. Background Information

1. Name ______________________________

2. Address ______________________________

____

3. School where you are teaching ______________________________

location ______________________________

4. Age in years ________

5. Male/Female (circle one)

6. Black/White/Spanish-surnamed (circle one)

B. Education and Experience

1. Please indicate below, for each type of training listed, the fields or areas in which you specialized in your educational training beyond high school, the degrees or certificates you received in these areas, and the number of years of training you have had.

Type of Training	Field of Specialization	Degree or Certificate	Years of Training
Two Year or Four Year College			
______________	__________	________	______
______________	__________	________	______
Technical or Vocational School			
______________	__________	________	______
______________	__________	________	______
Graduate School (training beyond bachelor's degree level)			
______________	__________	________	______
______________	__________	________	______
Apprenticeship Program			
______________	__________	________	______
______________	__________	________	______
Other (Please explain) ______			
______________	__________	________	______

2. Please describe any current educational program you are formally engaged in, such as work on a degree, in-service courses, etc.

3. Please list below the five most recent short courses or other in-service training programs you have completed. Describe the content of the program, its duration, and the dates of training.

Title or Subject	Dates	Duration
1.		
2.		
3.		
4.		
5.		

4. What is your teaching field?

5. How many years of teaching experience have you had
__________ in your field
__________ outside your field (please specify the subjects you have taught or are teaching outside your field) ____________________
____

6. How many years of work experience other than teaching have you had? Please specify type of work and number of years of experience for each type. Do not include short-term or parttime employment of less than one year's duration.

Type of Work	Years of Experience
1.	
2.	
3.	
4.	
5.	

7. Please list any professional organizations of which you are a member. If you have served as an officer in any organization, include the position held.

C. Colleague Recommendations

The state department of education hopes to invite a number of teachers to participate in a training and evaluation activity designed to provide vocational instructors with additional resources for their teaching. The following questions, which ask for information regarding your colleagues, are designed to help identify those individuals that teachers would be most willing to have represent them in the kind of activity described above. Please answer as honestly as possible; your responses will be held in strict confidence.

For each question, list no more than three of your fellow teachers. Please identify them by both first and last names.

1. Among the teachers with whom you are currently working, which ones would you be most likely to ask for professional assistance?

____

____

____

2. Among your fellow teachers, which ones do you most enjoy socializing with?

____

____

____

3. Which of your fellow teachers would you say are most likely to accept and adopt a new educational practice?

____

____

____

Teacher Questionnaire, Part II

All of the following 25 statements refer to various educational practices, approaches to teaching, and beliefs about instruction. How teachers feel about these practices, approaches, and beliefs is critically important in deciding how best to meet the needs of teachers. Resources, training, or other assistance provided to teachers should be compatible with the kind of educational environment with which teachers feel comfortable.

We are therefore interested in how you honestly feel about each of the 25 items that follow. It is your opinion, rather than what someone else says or feels, that matters. The statements are structured so that you indicate your degree of agreement or disagreement with each item by circling the appropriate response. Please respond to all the items.

Once again, your cooperation and assistance is appreciated.

Directions: Circle the response in the right hand column that best reflects your opinion on each statement.

Use: SA - Strongly Agree
A - Agree
D - Disagree
SD - Strongly Disagree

1. If a course is well-designed, it should enable all students to begin together, proceed through the instruction as a group at the same rate, and complete the course at the same time. SA A D SD

2. There should be more and better learning taking place when all of the students in a class use the same text. SA A D SD

3. An important reason for deciding what to teach and how to teach it is the need of the individual student. SA A D SD

4. Each student should have his own objectives toward which he can work. SA A D SD

5. A student should take a test when he is ready for it. SA A D SD

6. To determine quality of performance, each student's performance should be compared to the performance of his fellow students. SA A D SD

7. No student should be given a unit of instruction unless he has first been tested to find out whether the instruction is necessary for him. SA A D SD

8. A teacher should not be expected to work with a class where all of the students are working at their own rates. SA A D SD

9. Students should study that content which best meets their own needs and interests. SA A D SD

10. Learning is more efficient if all students in a class use the same materials and study the same lessons. SA A D SD

11. Even when working hard, some students need more time than others to complete their work. SA A D SD

12. By far the most important skills for teachers are being able to diagnose individual student needs and to prescribe appropriate instruction based on their diagnoses. SA A D SD

13. Giving students lots of different media to choose from in a course is wasteful and unnecessary. SA A D SD

14. Even though the content is the same, one set of instructional materials may interest a student more than another set. SA A D SD

15. A good teacher spends most of his instructional time in the classroom working with individual students. SA A D SD

16. A teacher can always find one best textbook for the students in the class. SA A D SD

17. All students should start and end a unit using the same materials. SA A D SD

18. When two students are doing the same lesson, it is unfair to give one student more time to complete the lesson than is given to the other student. SA A D SD

19. Students should always proceed at their own pace. SA A D SD

20. An instructional program is not well-designed unless every student has a set of objectives and learning activities selected especially for him. SA A D SD

21. The individualization of materials should include selecting the media which best suit the student. SA A D SD

22. Instruction ought to be adjusted, or changed, as frequently as necessary to meet the individual needs of students. SA A D SD

23. Students should have a variety of instructional materials to select from. SA A D SD

24. If a class includes slow, average, and fast learners, the best approach for the teacher is to teach on the level of the average student. SA A D SD

25. All students in a class should take the same tests so that the teacher can compare the grades. SA A D SD

Teacher Questionnaire, Part III

The final twenty questions which follow are general in nature and ask for your personal opinion about a variety of situations. There are no right or wrong answers to any of the questions, so please respond as you honestly feel about each of the questions.

Your time and your cooperation in filling out and returning this questionnaire are very much appreciated.

Directions: Circle the response in the right hand column that best reflects your opinion on each statement.

Use: SA - Strongly Agree
A - Agree
D - Disagree
SD - Strongly Disagree

1. I must admit that it makes me angry when other people interfere with my daily activity. SA A D SD

2. I find that a well-ordered mode of life with regular hours is congenial to my temperament. SA A D SD

3. It bothers me when something unexpected interrupts my daily routine. SA A D SD

4. I don't like to undertake any project unless I have a pretty good idea as to how it will turn out. SA A D SD

5. I find it hard to set aside a task that I have undertaken, even for a short time. SA A D SD

6. It's a good idea to have a strong point of view about things because that makes it easier to decide what's wrong or right. SA A D SD

7. A person who seldom changes his mind can usually be depended upon to have sound and reliable judgment on matters of importance. SA A D SD

8. Once a person makes up his mind about something he should stick to his conclusion instead of repeatedly hashing the question. SA A D SD

9. I rather like the idea of having friends drop in unexpectedly at odd hours. SA A D SD

10. I dislike doing anything just on the spur of the moment. SA A D SD

11. Few things are more upsetting than a sudden unexpected change of plans. SA A D SD

12. I never start anything I can't finish. SA A D SD

13. Once a person starts going off his budget, even by small amounts, he's on the road to financial difficulty. SA A D SD

14. The only way to make sure that things get done right is to set up a definite and fixed schedule and never depart from it. SA A D SD

15. There is usually only one best way to solve most problems. SA A D SD

16. I dislike changing my plans in the middle of an undertaking. SA A D SD

17. I would like a position which requires frequent changes from one kind of task to another. SA A D SD

18. I do not enjoy having to adapt myself to new and unusual situations. SA A D SD

19. I dislike having to learn new ways of doing things. SA A D SD

20. I think it is usually wise to do things in a conventional way. SA A D SD

APPENDIX G

FACULTY SURVEY

FACULTY SURVEY

Name ____________________
School ____________________

In the following questions, you are asked to name those vocational teachers under your jurisdiction who best meet the criteria stated in each question. Your nominations will be used to assist in the selection of teachers from your school most likely not only to profit from inservice training, but also to have the greatest impact in the subsequent diffusion of the results of that training within the school. Please feel free to answer each question with complete candor. Your responses will of course be confidential.

For each question, name a maximum of three teachers who best satisfy the conditions expressed in the question. Please rank order your responses.

A. Among the vocational teachers under your jurisdiction, which ones would other teachers be most likely to ask for professional assistance?

1.

2.

3.

B. Which of the vocational teachers under your jurisdiction would you say are most popular, in a social sense, with their colleagues?

1.

2.

3.

C. Which of the vocational teachers in your school would you say are most likely to accept and adopt a new educational practice?

1.

2.

3.

D. Which of the vocational teachers in your school would you say are most in favor of individualized instruction?

1.

2.

3.

E. Which vocational teachers under your jurisdiction do you feel would be least inclined towards individualizing their instruction?

1.

2.

3.

F. Among the vocational teachers in your school, which ones would you rate as generally the most flexible and adaptable?

1.

2.

3.

APPENDIX H

OBSERVATION PACKAGE

Daily Recording Form INDIVIDUALIZATION OF INSTRUCTION

your code # date

Instructions: Use more than one column for classes longer than one period. Note each instance of individualization with ✓ mark.
IMPORTANT: Mail forms for week on afternoon of last day of week.

Area of Individualization						
GOALS						
long-term ▷						
short-term ▷						
PERFORMANCE OBJECTIVES						
matched to ind. goal ▷						
CRITERION-REFERENCED TESTS						
pre-V-TECS level ▷						
pre-lesson ▷						
post-mastery ▷						
post-nonmastery ▷						
MEDIA SELECTION						
print ▷						
audio ▷						
still visual ▷						
human resources ▷						
motion visual ▷						
actual objects ▷						
LEARNING STRATEGIES						
. varied events of instruction ▷						
. tutoring						
peers ▷						
instructor ▷						
adv. student ▷						
community vol. ▷						
. pacing						
instructor ▷						
student ▷						
inst-student ▷						
proctor-student ▷						
. contingency management with any individual ▷						
LEARNING SEQUENCING						
sequence of goals ▷						
of objectives ▷						
of lessons or topics ▷						

Comments on class or day:

Signature

CURRICULUM DELIVERY SYSTEM FOR VOCATIONAL-TECHNICAL EDUCATION
107 W. Gaines Street, Tallahassee, Florida 32304

Explanation

Daily Recording Form for INIDVIDUALIZATION OF INSTRUCTION in Voc-Tech Education

Each of the six large areas of individualization (Goals, Performance Objectives, Criterion-Referenced Measurement, Media Selection, Learning Strategies, and Learning Sequencing) are shown with brief "memory jogger" to indicate what kinds of instances of individualization are to be noted by the instructor. A fuller listing of these descriptors of each area follows below. Put a check in the appropriate block on the observation sheet if:

GOALS

You assisted a student in deciding upon a long-term goal.

You assisted a student in deciding upon a short-term goal.

PERFORMANCE OBJECTIVES

A set of performance objectives was matched to an individual's goal.

CRITERION-REFERENCED TESTS

Pretest was used to identify un-mastered V-TECS level objectives

Pretest was used to identify un-mastered lesson objectives.

Posttest was used to individually prescribe next instruction based upon mastery of past instruction.

Posttest was used to individually prescribe next instruction based upon non-mastery of the past instruction.

MEDIA SELECTION

On the basis of individual need or preference:

You selected print instructional materials.
You selected audio instructional materials.
You selected still visuals (graphics).
You selected human resources.
You selected motion visuals.
You selected actual objects.

LEARNING STRATEGIES

You varied the events of instruction based on individual needs or preferences.

You used:

peer tutoring to meet individual needs.
instructor tutoring to meet individual needs.
an advanced student for tutoring to meet another student's needs.
a community volunteer for tutoring to meet individual needs.

You varied:

instructor pacing decisions on the basis of individual needs.
student pacing.
instructor-student pacing based upon individual needs.
proctor-student pacing based upon individual needs.

You used:

contingency management with any individual.

LEARNING SEQUENCING

You assisted a student in sequencing his/her short-term goal.

You varied the sequence of objectives for a student.

You varied the sequence of lessons or topics within an objective for an individual.

ACTUAL OBJECTS: Actual objects are the real objects, or scale models, mockups, cutaways, or simulators used to support instruction as instructional media.

ADVANCED STUDENT TUTORING: One-to-one interaction between a student more advanced in a course or program and one at a lower level in the course or program, the purpose of which is to engage the student in the necessary events of instruction.

AUDIO: Audio aids include disk (record) and tape recordings and their associated equipment. These audio impressions can be made on magnetic tape cassettes, reels, cards, etc.

COMMUNITY VOLUNTEER TUTORING: The use of persons from the community, with the necessary skills and knowledges, in a one-to-one interaction with a student in need of tutoring.

CONTINGENCY MANAGEMENT: Initiation of a formal plan for modifying academic or social behaviors, contingency management involves (1) accurate descriptions of the behaviors to be changed or developed, (2) observing and recording of the behaviors before and during application of the contingencies (3) application of contingencies such as behavioral contracts, token systems, or systematic use of approval and disapproval, and (4) evaluation of the effectiveness of the contingencies in changing the behaviors by comparing the frequency of the behaviors before and during contingencies.

EVENTS OF INSTRUCTION: Events of instruction are the components of a complete instructional experience. These events of instruction serve to:

(1) Get and hold the learner's attention; for example, using verbal communications such as "listen carefully" or by allowing the student take an active part in the learning process (doing experiments, solving problems, etc.).

(2) Inform the learner of the objectives of the instruction. There are many ways of doing this but all should include a specification of the behaviors required of the student after instruction, the conditions under which the behaviors are to occur, and the standards by which the instructor will determine if the student has met the objectives.

(3) Recall relevant learning. Verbal instructions may be used to relate prior learning experiences to the present one, review materials might be assigned, or any activity designed to help the student remember things that are necessary in the present learning experience.

(4) Present the learning materials. This may involve the use of a variety of media, and will generally involve instructions or directions related to the use of the materials.

(5) Provide learning guidance. Learning guidance involves the use of prompts, cues, or activities which help the learner to relate various aspects of the learning experience to each other. For example, relating the theory of internal combustion engines to their repair.

(6) Give the learner a chance to perform. This involves the use of practice exercises, tutoring, or other activities that allow the learner to show that he can perform according to the specifications of the objective.

(7) Give the learner information on his performance. Any activities that show whether the learner's performance is correct or incorrect.

(8) Assess the learner's performance. The use of criterion-referenced tests determining whether the student has met the objectives.

(9) Provide for retention and transfer. Activities that make the learning material more meaningful to the learner, more relevant to the tasks on the job, or that give opportunities for practice.

GOALS: The stated aims of the learner in enrolling in a given curriculum or course of study. Vocational goals may be either short-term or long-term. Short-term goals involve the acquisition of a specific job skill such as typing, carburetor adjustment, or plant propagation; long-term goals involve entry into a given job, such as secretary, automobile mechanic, or nursery worker.

GRAPHICS: See STILL VISUALS.

HUMAN RESOURCES: Human resources are instructors, paraprofessionals, practitioners from the community, former students, peer tutors, and others.

INSTRUCTOR PACING: The instructor makes the major decisions regarding the rate of introduction of the events of instruction.

INSTRUCTOR-STUDENT PACING: The instructor and the student collaborate in making pacing decisions.

INSTRUCTOR TUTORING: One-to-one interaction between the instructor and a student, the purpose of which is to engage the student in the necessary events of instruction.

LESSON OBJECTIVE: See PERFORMANCE OBJECTIVE.

MASTERY: In terms of a learning task, mastery refers to meeting all of the specified minimum requirements for completion of that task.

MOTION VISUAL: Motion pictures include black and white, color, silent, or sound 8 mm or 16 mm film directly photographed or produced by kinescope recording.

NONMASTERY: In terms of a learning task, nonmastery refers to the inability to meet all of the specified minimum requirements for completion of that task.

PACING: The determination of the rate of introduction of the events of instruction.

PEER TUTORING: One-to-one interaction between a student who has already mastered an objective and one who needs additional help on the objective, the purpose of which is to engage the student in the necessary events of instruction.

PERFORMANCE OBJECTIVE: A statement in precise, measurable terms of a particular behavior to be exhibited by the learner. In addition to stating the specific behavior, it states the conditions under which the learner will perform the behavior, and the standard or degree of acceptable performance. V-TECS LEVEL OBJECTIVE is a performance objective written for instruction from a job task. The instruction for the V-TECS level objective can generally be described as a "unit," which in turn is composed of lessions. LESSON OBJECTIVE is a performance objective written by breaking down a V-TECS level objective into all of the elements a learner "must know" and "must do" before he can master the V-TECS level objective. One or more of these "must know" and "must do" objectives is used to design a lesson, or learning experience.

POSTTEST: A criterion-referenced test given after the instructional sequence. The data from the posttest can be used to determine student mastery of the objectives and/or the effectiveness of the instruction.

PRETEST: A criterion-referenced test used before instruction to determine whether (a) an individual possesses certain behaviors needed to perform in a course of instruction, and/or (b) to see if the individual already possesses some of the behaviors to be instructed. Pretest results can be used to omit already mastered instruction in an individualized system.

PRINT: Printed or duplicated aids are materials used to support instruction in the form of books, manuals, periodicals, pamphlets, regulations, directives, handouts, or the like.

PROCTOR-STUDENT PACING: A student (i.e., the proctor) monitors other students' progress and gives tests and assignments when each student is ready for them.

SEQUENCING: Organizing instruction to make learning more efficient and effective for the individual student. Goal sequencing involves arranging a student's passage through short-term goals, to provide him with job entry-level skills as soon as possible; objectives sequencing refers to the arrangement of instructional objectives in an order which both maximizes learning and promotes early acquisition of skills and knowledges; lesson or topic sequencing occurs at the most specific level of instruction, when the instructor organizes the bits and pieces of instruction into a meaningful whole in order to guide the learner to mastery of a given objective.

STILL VISUALS: (Also called GRAPHICS.) Still visuals are graphic aids which communicate facts and ideas through a combination of pictures, drawings, symbols, and words.

STUDENT PACING: The student makes the major pacing decisions. The student determines when he will engage in the necessary events of instruction, such as taking a test or beginning a new lesson.

TUTORING: An instructional technique in which instruction is carried out by an individual, acting as instructor, in a one-to-one interaction with the learner.

V-TECS LEVEL OBJECTIVE: See PERFORMANCE OBJECTIVE.

APPENDIX I

INDIVIDUALIZATION OF INSTRUCTION QUESTIONNAIRE

STATE UNIVERSITY SYSTEM OF FLORIDA
107 W. Gaines Street, Tallahassee, Florida 32304

Curriculum Delivery System for
Vocational-Technical Education
904-488-1954

M E M O R A N D U M

TO: Fieldtest Instructors

FROM: Bob Fagan, Statistical Specialist

DATE: September 26, 1975

RE: Individualization Tally Sheet

Now that you have had a few weeks to record individualization information on the daily form, we'd like to know how you feel about your use of various techniques. The enclosed scale asks you to mark the extent to which you presently use different methods. We'll appreciate your filling out the scale carefully, and returning it to us by October 6. A stamped, addressed envelope is enclosed.

We continue to appreciate all of the information you send, and look forward to assembling much of it in the final report to the U.S. Office of Education and The State of Florida.

We'll be visiting you again shortly.

BF:ajw

iversity of Florida Gainesville • Florida State University Tallahassee • Florida A. & M. University Tallahassee • University of South Florida Tampa • Florida Atlantic University Boca Raton
University of West Florida Pensacola • Florida Technological University Orlando • University of North Florida Jacksonville • Florida International University Miami

STATE UNIVERSITY SYSTEM OF FLORIDA
107 W. Gaines Street, Tallahassee, Florida 32304

Curriculum Delivery System for
Vocational-Technical Education
904-488-1954

MEMORANDUM

TO: Fieldtest Instructors

FROM: Bob Fagan, Statistical Specialist

DATE: December 8, 1975

Re: Individualization Questionnaire

Enclosed is an individualization scale like the one you filled out in October. We'll appreciate your filling out this scale as carefully as the previous one, and returning it to us by January 9, 1975. A stamped, addressed envelope is enclosed.

We continue to appreciate your cooperation and look forward to working with you over the next four months.

BF/dc
Enclosures

niversity of Florida, Gainesville • Florida State University, Tallahassee • Florida A. & M. University, Tallahassee • University of South Florida, Tampa • Florida Atlantic University, Boca Raton
University of West Florida, Pensacola • Florida Technological University, Orlando • University of North Florida, Jacksonville • Florida International University, Miami

COVER MEMORANDUM FOR THIRD QUESTIONNAIRE IS THE SAME AS THAT USED FOR THE THIRD DISTRIBUTION OF THE PROCEDURAL MANUAL USE INDEX (APPENDIX J)

INDIVIDUALIZATION OF INSTRUCTION

NAME: ______________________________ DATE: ______________

SCHOOL: ______________________________

TEACHING AREA: ______________________________

INSTRUCTIONS: Listed below are a number of areas of individualization. These are broken down into subareas or techniques which represent individualization behaviors. To the right of each technique is a nine point scale. The scale points are numbered from 1 to 9, where 1 stands for "never use," 5 for "moderate use," and 9 for "use very frequently." The numbers between 5 and 1 stand for decreasing usage, while the numbers between 5 and 9 stand for increasing usage. For each technique of individualization indicate on the scale on its right the extent to which you use that technique. Place a check mark at the point that most accurately represents the extent to which you presently use each technique. Remember, the mid-point on the scale represents "moderate" usage, points to the left of the mid-point represent decreasing usage, while points to the right represent increasing usage.

AREA OF INDIVIDUALIZATION:

	never use								use very frequently
GOALS									
You assisted a student in deciding upon a long-term goal.	1	2	3	4	5	6	7	8	9
You assisted a student in deciding upon a short-term goal.	1	2	3	4	5	6	7	8	9
PERFORMANCE OBJECTIVES									
A set of performance objectives was matched to an individual's goal.	1	2	3	4	5	6	7	8	9
CRITERION-REFERENCED TESTS									
Pretest was used to identify un-mastered V-TECS (or terminal) level objectives.	1	2	3	4	5	6	7	8	9
Pretest was used to identify un-mastered lesson objectives.	1	2	3	4	5	6	7	8	9
Posttest was used to individually prescribe next instruction based upon mastery of past instruction.	1	2	3	4	5	6	7	8	9
Posttest was used to individually prescribe next instruction based upon non-mastery of the past instruction.	1	2	3	4	5	6	7	8	9

	never use								use very frequently
MEDIA SELECTION									
On the basis of individual need or preference:									
You selected print instructional materials.	1	2	3	4	5	6	7	8	9
You selected audio instructional materials.	1	2	3	4	5	6	7	8	9
You selected still visuals (graphics).	1	2	3	4	5	6	7	8	9
You selected human resources.	1	2	3	4	5	6	7	8	9
You selected motion visuals.	1	2	3	4	5	6	7	8	9
You selected actual objects.	1	2	3	4	5	6	7	8	9
LEARNING STRATEGIES									
You varied the events of instruction based on individual needs or preferences.	1	2	3	4	5	6	7	8	9
You used:									
peer tutoring to meet individual needs.	1	2	3	4	5	6	7	8	9
instructor tutoring to meet individual needs.	1	2	3	4	5	6	7	8	9
an advanced student for tutoring to meet another student's needs.	1	2	3	4	5	6	7	8	9
a community volunteer for tutoring to meet individual needs.	1	2	3	4	5	6	7	8	9
You varied:									
instructor pacing decisions on the basis of individual needs.	1	2	3	4	5	6	7	8	9
student pacing.	1	2	3	4	5	6	7	8	9
instructor-student pacing based upon individual needs.	1	2	3	4	5	6	7	8	9
proctor-student pacing based upon individual needs.	1	2	3	4	5	6	7	8	9
You used:									
contingency management with an individual.	1	2	3	4	5	6	7	8	9

LEARNING SEQUENCING	never use								use very frequently
You assisted a student in sequencing his/her short-term goal.	1	2	3	4	5	6	7	8	9
You varied the sequence of objectives for a student.	1	2	3	4	5	6	7	8	9
You varied the sequence of lessons or topics within an objective for an individual.	1	2	3	4	5	6	7	8	9

APPENDIX J

INDEX OF USE OF PROCEDURAL MANUALS FIRST, SECOND, & THIRD DRAFTS

INDEX OF USE OF
PROCEDURAL MANUALS (FIRST DRAFT)

NAME:______________________________ DATE:________________

SCHOOL:____

TEACHING AREA:____

As CDS project participants, you have had the Procedural Manuals since the August workshop. We recognize that depending on your individual circumstances you may or may not have had much time to read, review, or critique the first draft manuals. We would like you to estimate the amount of time you spent either reading, reviewing, or critiquing the manuals since the August workshop.

DIRECTIONS: Listed below are the titles of the first draft Procedural Manuals. To the right of each title is a nine-point scale. The scale points are numbered from 1 to 9, where 1 indicates that you have never read that manual and 9 indicates that you have read that manual very frequently. The scale point 5 indicates that you have spent a moderate amount of time reading that manual. For each manual indicate on the scale on its right the extent to which you have read, reviewed, or critiqued that manual since leaving the August workshop. Place a check mark at the scale point that most accurately represents your reading of the manuals.

PROCEDURAL MANUAL:

	Never								Very Frequently
SECTION 1. Setting Individual Goals	1	2	3	4	5	6	7	8	9
SECTION 2. Using Performance Objectives and Criterion-Referenced Tests									
*Selecting and Analyzing Performance Objectives	1	2	3	4	5	6	7	8	9
*Developing and Administering Criterion-Referenced Tests	1	2	3	4	5	6	7	8	9
SECTION 3. Developing Learning Experiences									
*Determining Media Requirements	1	2	3	4	5	6	7	8	9
*Reviewing, Selecting, and Adapting Instructional Materials	1	2	3	4	5	6	7	8	9
*Sequencing Instruction	1	2	3	4	5	6	7	8	9
SECTION 4. Applying Instructional Strategies									
*Using Learning Strategies	1	2	3	4	5	6	7	8	9
*Applying Contingency Management	1	2	3	4	5	6	7	8	9
*Applying Pacing Alternatives	1	2	3	4	5	6	7	8	9
*Applying Tutoring Alternatives	1	2	3	4	5	6	7	8	9
SECTION 5. Evaluating the Instructional Program									
*Conducting Internal Evaluation	1	2	3	4	5	6	7	8	9
*Conducting External Evaluation	1	2	3	4	5	6	7	8	9
GLOSSARY	1	2	3	4	5	6	7	8	9

STATE UNIVERSITY SYSTEM OF FLORIDA
107 W. Gaines Street, Tallahassee, Florida 32304

Curriculum Delivery System for
Vocational-Technical Education
904-488-1954

MEMORANDUM

TO: Fieldtest Instructors

FROM: Robert Fagan, Statistical Specialist

DATE: December 17, 1975

Re: Second Index of Manual Use

Once again we need your help in evaluating our project activities and products. Enclosed is a second index of manual use entitled INDEX OF USE OF PROCEDURAL MANUALS (SECOND DRAFT). This index is similar to the one you filled out at the October 25th workshop; the only changes are those necessitated by changes in the format of the Second Draft Procedural Manuals.

Please fill out the scale carefully and return it to us by January 9, 1976. A stamped, addressed envelope is enclosed.

Thank you for contributing to the success of this project.

RF/dc
Enclosure

iversity of Florida Gainesville • Florida State University Tallahassee • Florida A. & M. University Tallahassee • University of South Florida Tampa • Florida Atlantic University Boca Raton
University of West Florida Pensacola • Florida Technological University Orlando • University of North Florida Jacksonville • Florida International University Miami

INDEX OF USE OF
PROCEDURAL MANUALS (SECOND DRAFT)

NAME:______________________________________DATE: ________________

SCHOOL:____

TEACHING AREA:____

DIRECTIONS: Listed below are the titles of the Second Draft procedural manuals. Also listed are the sections or parts of each manual. To the right of each section or part is a nine-point scale. The scale points are numbered from 1 to 9, where 1 indicates that you have never read that section or part and 9 indicates that you have read that section or part very frequently. The scale point 5 indicates that you have spent a moderate amount of time reading that section or part. For each section or part indicate on the scale on its right the extent to which you have read, reviewed, or critiqued that section or part. Your estimate of the time spent on each section or part should include the time before, during, and after the October 25 workshop up to the time you received the Third Draft Manual. Place a check mark at the scale point that most accurately represents your reading of the manuals.

PROCEDURAL MANUAL:	NEVER						VERY FREQUENTLY		
1. Goals	1	2	3	4	5	6	7	8	9
2. How to Use Performance Objectives and Criterion-Referenced Tests to Individualize Instruction									
SECTION 1 - How Performance Objectives and Criterion-Referenced Tests Can Be Used to Individualize Instruction	1	2	3	4	5	6	7	8	9
SECTION 2 - How a Catalog of Objectives From An Occupational Survey Can Help Validate Course Objectives	1	2	3	4	5	6	7	8	9
SECTION 3 - How Performance Objectives Can Be Analyzed For Instructional Development	1	2	3	4	5	6	7	8	9
SECTION 4 - How to Write Performance Objectives	1	2	3	4	5	6	7	8	9
SECTION 5 - How to Write Criterion-Referenced Tests for Performance Objective Mastery	1	2	3	4	5	6	7	8	9
3. Learning Experiences									
I. Using Different Learning Experiences for Individualized Instruction	1	2	3	4	5	6	7	8	9
II. Selecting Media for Individualized Learning Experiences	1	2	3	4	5	6	7	8	9
III. Reviewing and Selecting Existing Instructional Materials	1	2	3	4	5	6	7	8	9
4. Learning Strategies									
I. Using Learning Strategies in Instructional Development	1	2	3	4	5	6	7	8	9
II. Behavior Modification in Individualized Instructional Settings	1	2	3	4	5	6	7	8	9

		NEVER						VERY FREQUENTLY		
III.	Tutoring	1	2	3	4	5	6	7	8	9
IV.	Pacing	1	2	3	4	5	6	7	8	9
V.	Using Learning Strategies in Vocational-Technical Instruction	1	2	3	4	5	6	7	8	9
5.	Evaluation									
	Evaluating Individualized Instruction	1	2	3	4	5	6	7	8	9

Career Education Center

Curriculum Delivery System Project

MEMORANDUM

TO: Fieldtest Instructors

FROM: Robert Fagan

DATE: March 29, 1976

Re: Use of Procedural Manual

We have enclosed two questionnaires we would like you to fill out. One is entitled INDEX OF USE OF PROCEDURAL MANUAL (THIRD DRAFT). Group 1 instructors have completed similar questionnaires related to their use of the first and second drafts of the procedural manual. A third INDIVIDUALIZATION OF INSTRUCTION questionnaire is the other questionnaire enclosed. Both Group 1 and Group 2 instructors will recognize this one.

Please complete both questionnaires carefully and return them to us by April 9, 1976. A stamped, addressed envelope is enclosed.

Thank you for cooperating with us.

RLF/dc
Enclosures

Florida State University, Johnston Building, 415 N. Monroe Street, Tallahassee, Florida 32306 (904) 644-2440

INDEX OF USE OF
PROCEDURAL MANUAL (THIRD DRAFT)

NAME: ______________________________ DATE: ______________

SCHOOL: ____

TEACHING AREA: ____

DIRECTIONS: Listed below are the titles of the sections and parts of the Third Draft procedural manual. To the right of each section or part is a nine-point scale. The scale points are numbered 1 to 9, where 1 indicates that you have never read that section or part and 9 indicates that you have read that section or part very frequently. The scale point 5 indicates that you have spent a moderate amount of time reading that section or part. For each section or part indicate on the scale on its right the extent to which you have read, reviewed, or critiqued that section or part. Your estimate should include the time from the day you received the third draft manual, in early December, until the day you received the fourth draft manual, in the middle of March. Place a check mark at the scale point that most accurately represents your reading of the manual.

PROCEDURAL MANUAL

I. GOALS	NEVER								VERY FREQUENTLY
1. Overview	1	2	3	4	5	6	7	8	9
2. Obtaining Personal Information on the student	1	2	3	4	5	6	7	8	9
3. Presenting Job-Related Information to the student	1	2	3	4	5	6	7	8	9
4. Obtaining Information on the Job Market	1	2	3	4	5	6	7	8	9
5. Sequencing Short-Term Goals	1	2	3	4	5	6	7	8	9

II. PERFORMANCE OBJECTIVES AND CRITERION-REFERENCED TESTS

NEVER — VERY FREQUENTLY

1. Performance Objectives, Criterion-Referenced Tests and Individualized Instruction — 1 2 3 4 5 6 7 8 9
2. How to Use Performance Objectives and Criterion-Referenced Tests to Individualized Instruction — 1 2 3 4 5 6 7 8 9
3. How a Catalogue of Objectives from an Occupational Survey Can Help Validate Course Objectives — 1 2 3 4 5 6 7 8 9
4. How Performance Objectives Can be Analyzed for Instructional Development — 1 2 3 4 5 6 7 8 9
5. How to Write Criterion-Referenced Tests for Performance Objective Mastery — 1 2 3 4 5 6 7 8 9

III. LEARNING EXPERIENCES

1. Using Different Learning Experiences for Individualized Instruction — 1 2 3 4 5 6 7 8 9
2. Selecting Media for Individualized Learning Experiences — 1 2 3 4 5 6 7 8 9
3. Reviewing, Selecting, and Adapting Materials for Individualized Instruction — 1 2 3 4 5 6 7 8 9

IV. LEARNING STRATEGIES

1. Using Learning Strategies in Instructional Development — 1 2 3 4 5 6 7 8 9
2. Behavior Modification in Individualized Instructional Settings — 1 2 3 4 5 6 7 8 9
3. Tutoring — 1 2 3 4 5 6 7 8 9

	NEVER								VERY FREQUENTLY
4. Pacing	1	2	3	4	5	6	7	8	9
5. Using Learning Strategies in the Vocational-Technical Laboratory	1	2	3	4	5	6	7	8	9
V. EVALUATING INDIVIDUALIZED INSTRUCTION	1	2	3	4	5	6	7	8	9

APPENDIX K

PROCEDURAL MANUAL EVALUATION

STATE UNIVERSITY SYSTEM OF FLORIDA
107 W. Gaines Street, Tallahassee, Florida 32304

Curriculum Delivery System for
Vocational-Technical Education
904-488-1954

MEMORANDUM

TO: Fieldtest Instructors

FROM: Robert Fagan, Statistical Specialist

DATE: January 5, 1976

Re: Procedural Manual Evaluation

By this time you should have received the Third Draft Procedural Manual and the audio taped version of the Manual. If you did not receive these two items, please call us immediately.

We are revising the Third Draft now and need your help. We'll appreciate your filling out the enclosed Workshop Questionnaire and returning it to us by January 31, 1976. A stamped, addressed envelope is enclosed.

Thanks for your help.

RF/dc
Enclosure

rsity of Florida Gainesville . Florida State University Tallahassee . Florida A. & M. University Tallahassee . University of South Florida Tampa . Florida Atlantic University Boca Raton
University of West Florida Pensacola . Florida Technological University Orlando . University of North Florida Jacksonville . Florida International University Miami

WORKSHOP QUESTIONNAIRE

(Procedural Manual Evaluation)

NAME: ________________________________ DATE: ________________

SCHOOL: ____

TEACHING AREA: ____

DIRECTIONS: The sections of the procedural manual are listed below. For each section, we would like you to answer a few questions. Please answer all questions except those addressed to sections that you have not read.

SECTION I. GOALS (including Appendices)

a) If you have not read this section, go to Section II.

b) Is the language level of this section too difficult? YES____ NO____

If YES, please comment ____

____

____

c) Did the illustrations or examples help you to understand the concepts?

YES ____ NO ____

If NO, please comment ____

____

____

d) Do you like the format of this section? YES____ NO ____

Please comment ____

____

____

e) Does this section give you enough information to be able to individualize your goal-setting activities? YES ____ NO ____

If NO, please comment ____

____

____

SECTION II. PERFORMANCE OBJECTIVES AND CRITERION-REFERENCED TESTS

a) This section is divided into five parts; if you have not read at least one of these parts, go to Section III.

b) Check the numbers of the parts of this section that you have read:

Part 1___, Part 2 ___, Part 3 ___, Part 4 ___, Part 5 ___.

c) In any of the parts is the language level too difficult?

YES ____ NO ____. If YES, list the part number(s) and comment.

____

____

____

d) Did the illustrations or examples help you to understand the concepts?

YES ____ NO ____. If NO, please comment ________________________

____

____

e) Do you like the format of all of the parts of this section?

YES ____ NO ____. If NO, list the part number(s) and comment.

____

____

____

f) Does this section give you enough information to be able to individualize your use of performance objectives and criterion-referenced tests? YES ____ NO ____. If NO, list the part number(s) and comment. ____

____

____

SECTION III. LEARNING EXPERIENCES (including Media Chart)

a) This section is divided into three parts; if you have not read at least one of these parts, go to Section IV.

b) Check the numbers of the parts of this section that you have read:

Part 1 ___, Part 2 ___, Part 3 ___.

c) In any of the parts is the language level too difficult?

YES ____ NO ____. If YES, list the part number(s) and comment.

d) Did the illustrations or examples help you to understand the concepts?

YES ____ NO ____ . If NO, please comment ____________________

e) Do you like the format of all of the parts of this section?

YES ____ NO ____. If NO, list the part numbers and comment

f) Does this section give you enough information to be able to individualize learning experiences? YES ____ NO ____. If NO, list the part number(s) and comment ____________________

SECTION IV. LEARNING STRATEGIES

a) This section is divided into five parts; if you have not read at least one of these parts, go to Section V.

b) Check the numbers of the parts of this section that you have read:

Part 1 ___, Part 2 ___, Part 3 ___, Part 4 ___, Part 5 ___.

c) In any of the parts is the language level too difficult?

YES ____ NO ____. If YES, list the part number(s) and comment

d) Did the illustrations or examples help you to understand the concepts?

YES ____ NO ____. If NO, please comment ____________________

e) Do you like the format of all of the parts of this section?

YES ____ NO ____. If NO, list the part number(s) and comment

f) Does this section give you enough information to be able to individualize learning strategies? YES ____ NO ____. If NO, list the part number(s) and comment ____________________

SECTION V. EVALUATING INDIVIDUALIZED INSTRUCTION

a) If you have not read this section, go to Section VI.

b) Is the language level of this section too difficult? YES ____ NO ____.
If YES, please comment ____________________

c) Did the illustrations or examples help you to understand the concepts?

YES ____ NO ____. If NO, please comment ______________________________

____

____

d) Do you like the format of this section? YES ____ NO ____.

Please comment ____

____

____

e) Does this section give you enough information to be able to evaluate individualized instruction? YES ____ NO ____. If NO, please comment ____

____

____

SECTION VI. AUDIO TAPE VERSION

a) Did you listen to the audio tape version in its entirety?

YES ____ NO ____. If NO, which sections or parts did you listen to? ____

____

b) If you did use the audio tape version, did listening to the tapes help you to understand the concepts in the procedural manual?

YES ____ NO ____. Please comment ________________________________

____

____

c) If you did not use the audio tapes, do you think they would help understanding the concepts in the procedural manual? YES ____ NO ____.

Please comment ____

____

d) Which one of the following approaches will lead to maximum understanding of the procedural manual? Check one.

1. The printed manual alone ________ .
2. The audio tape version alone ________.
3. The printed and taped version combined _______.

e) Which one of the following approaches would you prefer? Check one.

1. The printed manual alone _________.
2. The audio tape version alone _________.
3. The printed and taped versions combined _________.

APPENDIX L

INDIVIDUALIZATION CONSTRAINTS QUESTIONNAIRE

Career Education Center

Curriculum Delivery System Project

May 10, 1976

Dear

With this letter is enclosed a questionnaire which we hope you will find the time to answer in the next few days. This questionnaire is particularly important, we feel, since it will give us a final opportunity to obtain information from you regarding the needs of teachers in implementing individualized, competency-based vocational education. Your responses to the questionnaire will be used as the basis for our personal interviews with you, to be conducted in the next two weeks. Someone from the CDS staff will be contacting you to arrange this interview. Please have your questionnaire with you at the time of the interview.

In addition to the information we are soliciting from you, we would very much appreciate any additional concerns, opinions, or criticisms you might have regarding either the manual or the operation of the project itself. We urge you to write us--anonymously, if you prefer--and tell us honestly what you think we might have done differently, how we might have better utilized teacher expertise, etc. If there are aspects of the project that you felt were poorly managed or carelessly put together, please let us know what these were. If there were things you think we did exceptionally well, let us know about those, too! Our sincere interest is in improving our own approach to project management should we be funded for a follow-up to the current project.

If such a follow-up occurs, we hope to be able to call on many of you to work with us again, in the dissemination and diffusion of the individualized approach to vocational education. In the meantime, we are working hard to produce the final draft of the manual, which you should receive by the end of June.

Let me end by saying how greatly all of us have enjoyed working with you and how very much we appreciate your cooperation and attentiveness to the CDS project.

Sincerely yours,

C. Tracy Harrington
Project Manager

CTH/dc
Enclosure

Florida State University, Johnston Building, 415 N. Monroe Street, Tallahassee, Florida 32301, [904] 644-3066

CURRICULUM DELIVERY SYSTEM PROJECT

INDIVIDUALIZATION CONSTRAINTS QUESTIONNAIRE

MAY 1976

NAME ____ DATE ____________________

TEACHING FIELD ____

SCHOOL ____

This questionnaire is composed of 23 items related to the five sections of the procedural manual, and two items related to training needs. The main purpose of the questionnaire is to find out what you see as important constraints against implementing individualized instruction:

Accompanying the questionnaire is a profile of your reported use of the individualization techniques covered in the manual. When filling out the questionnaire, please consider the extent to which you used each technique and the factors that affected your use of the techniques.

We would like you to consider six constraining factors:

1. Student characteristics
2. Administrative factors
3. Time factors
4. Vocational teaching area
5. Lack of media, materials, or other resources
6. Lack of training in or familiarity with technique

Think about each of these factors and how it has affected individualization in your classroom.

The six constraints are listed at the top of each of the succeeding pages. The numbers 1 through 6 to the right of each of the first 23 items correspond to the constraints listed at the top of the page. For example, the number 1 corresponds to student characteristics, 2 corresponds to administrative factors, and so on.

For each item, circle the number or numbers that stand for the constraints that have influenced your use of the individualization techniques represented by the items. After identifying the constraints for an item, by placing a circle around the appropriate number or numbers, use the lines below the item to specify the constraints in greater detail. For example, if you circled number 1 (student characteristics) for item 1 (Obtaining personal information on the student), what student characteristics made this aspect of individualization difficult for you? Did you have too many students? Did you have a student who would not give you the information you needed to individualize goal settings? What exactly is it about your students that hinders your ability to obtain personal information to individualize goal setting? Use additional sheets of paper, if necessary, to give us a complete picture of the constraints that influence the extent to which you individualize. If you think of constraints other than those listed, please list and explain them.

After you respond to items 1 through 23, then answer items 24 and 25. These items concern training needed to implement the CDS approach to individualization. Item 24 lists several general alternatives to teacher inservice and preservice training. Place a check mark in the brackets to the right of the training alternatives you think are necessary to implement the CDS approach to individualization. Use the back of the page to specify alternatives not listed or to discuss alternatives a. through d. in greater detail.

For item 25 consider your present skills and the skills needed to implement the individualization techniques in the various sections of the manual. Use the discrepancy between your present skills and those described in each section of the manual as a basis for rank ordering the individualization techniques (by section) according to training requirements.

1. Student characteristics
2. Administrative factors
3. Time factors
4. Vocational teaching area
5. Lack of media, materials, or other resources
6. Lack of training in or familiarity with technique

I. SETTING AND SEQUENCING INDIVIDUAL VOCATIONAL GOALS

1. Obtaining Personal Information on the Student 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

2. Presenting Job-related Information to the Student 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

3. Obtaining Information on the Job Market 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

4. Sequencing Short-term Goals 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

1. Student characteristics
2. Administrative factors
3. Time factors
4. Vocational teaching area
5. Lack of media, materials, or other resources
6. Lack of training in or familiarity with technique

II. UTILIZING PERFORMANCE OBJECTIVES AND CRITERION-REFERENCED TESTS TO INDIVIDUALIZE INSTRUCTION

5. Using Performance Objectives to Individualize Instruction 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

6. Analyzing Performance Objectives for Instructional Development 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

7. Writing Performance Objectives 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

8. Validating Course Objectives Through the use of an Occupational Survey Catalogue 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

1. Student characteristics
2. Administrative factors
3. Time factors
4. Vocational teaching area
5. Lack of media, materials, or other resources
6. Lack of training in or familiarity with technique

9. Using Criterion-Referenced Tests to Individualize Instruction 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

10. Constructing Criterion-Referenced Tests 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

11. Determining the Number of Items on a Criterion-Referenced Test 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

III. USING INSTRUCTIONAL STRATEGIES TO INDIVIDUALIZE LEARNING EXPERIENCES

12. Determining and Utilizing Learner and Task Characteristics 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

1. Student characteristics
2. Administrative factors
3. Time factors
4. Vocational teaching area
5. Lack of media, materials, or other resources
6. Lack of training in or familiarity with technique

13. Utilizing Media for Individualization 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

14. Reviewing, Selecting, and Adapting Instructional Materials 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

15. Pacing 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

16. Tutoring 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

17. Grouping 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

1. Student characteristics
2. Administrative factors
3. Time factors
4. Vocational teaching area
5. Lack of media, materials, or other resources
6. Lack of training in or familiarity with technique

IV. USING CONTINGENCY MANAGEMENT IN INDIVIDUALIZED SETTINGS

18. Setting up a Contingency Management Program 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

19. Using Contingency Management to Individualize Instruction 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

V. EVALUATING AND MANAGING INDIVIDUALIZED INSTRUCTION

20. Formative Evaluation 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

21. Summative Evaluation 1 2 3 4 5 6
Specify constraints ____________________
____
____
____

1. Student characteristics
2. Administrative factors
3. Time factors
4. Vocational teaching area
5. Lack of media, materials, or other resources
6. Lack of training in or familiarity with technique

22. Recordkeeping 1 2 3 4 5 6
Specify constraints ______________________
____
____
____

23. Grading 1 2 3 4 5 6
Specify constraints ______________________
____
____
____

VI. TRAINING NEEDS

24. What kind of training would be required of a teacher to be able to implement the CDS approach to individualized instruction? (Check as many as appropriate.)

a. A one-day workshop . . . . ( )
b. A workshop lasting two or more days . . . . ( )
c. Extensive inservice training . . . . ( )
d. A university course . . . . ( )
e. Other (specify) . . . . ( )

25. Rank order, from most to least, the major sections of the manual according to the training needed to implement the techniques covered in that section. Place the section numbers (I, II, III, IV, or V) in the appropriate brackets below.

( ) ( ) ( ) ( ) ( )

Most training needed — Least training needed

APPENDIX M

PRINCIPAL/DIRECTOR QUESTIONNAIRE

Career Education Center

Curriculum Delivery System Project

March 29, 1976

Mr. Gene Prough, Assistant Director
Washington-Holmes Area Vocational
Technical Center
Chipley, FL 32428

Dear Mr. Prough:

This letter is a follow-up to the conversation we had with you during February regarding the individualized instruction project in vocational education. As we indicated to you then, we are eager to get your opinion of the manual that has been developed and of the approach presented in that manual. We are also interested in getting your suggestions for the best ways to disseminate the approach that is presented in the manual.

With this letter is enclosed a questionnaire developed to help us obtain the information we need. Please answer the questions as fully as you can and return the completed questionnaire to us in the stamped, addressed envelope which is provided. Two extra copies of the questionnaire are enclosed in case there are others on your administrative staff that you would want to complete the questionnaire.

In responding to the questionnaire, please comment fully and as candidly as you feel inclined. If the specific questions asked do not address the comments you wish to make, feel free to include them in your general comments.

We very much appreciate your cooperation in making this project a success and look forward to hearing from you soon.

Sincerely yours,

C. Tracy Harrington
Project Manager

CTH/dc
Enclosures

Florida State University, Johnston Building, 415 N. Monroe Street, Tallahassee, Florida 32306 [904] 644-2440

CURRICULUM DELIVERY SYSTEM PROJECT

PRINCIPAL/DIRECTOR QUESTIONNAIRE

MARCH 1976

NAME ____

SCHOOL ____

DATE ____

The questions which follow are divided into three categories: (1) those concerning the procedural manual itself, (2) those concerning the approach described in the manual, and (3) those concerning dissemination and diffusion.

I. PROCEDURAL MANUAL

When responding to the following items, please remember that the final version of the manual will be a printed, bound, soft cover edition approximately 125 pages long.

Please refer comments to specific sections or parts if appropriate.

1. Is the language level appropriate for vocational instructors in your school? YES ____ NO ____. Please comment.

   ____

   ____

   ____

   ____

2. Do the illustrations and examples make the concepts easier to understand? YES ____ NO ____. Please comment. ______________

   ____

   ____

   ____

   ____

3. Do you like the format of the manual? YES _____ NO _____. Please comment. ______________________________________

   ____

   ____

   ____

4. Please comment on the content of the manual. Are any sections particularly valuable? Are any inappropriate? Please explain.

   ____

   ____

   ____

   ____

   ____

   ____

II. APPROACH TO INDIVIDUALIZATION

Base your responses to the following questions on what you have read in the manual or discussed with your teachers about the manual.

1. Do you think the manual presents a comprehensive approach to individualization? YES____ NO ____. Please comment. __________

2. Do you think the approach to individualization described in the manual is realistic and can be implemented? YES ____ NO ____. Please comment. __________

3. Do you think the manual describes a cost-effective approach to individualization? YES ____ NO ____. Please comment. __________

4. What attitudes do you think the following groups might have toward a system of instruction based on the manual:

   Teachers? __________

   Students? __________

Administrators? ____

Potential Employers? ____

5. What characteristics of your student body do you think will hinder the approach to individualization described in the manual?

6. What characteristics of your student body do you think will help to implement the approach to individualization described in the manual? ____

7. Does your school have adequate materials and resources to implement the approach to individualization described in the manual? YES ____ NO ____. Please comment. ____

8. Does your county have adequate materials and resources to implement the approach to individualization described in the manual? YES ____ NO ____. Please comment. ____

9. Do you know of any administrative policies, regulations, or procedures that would hinder implementation of the approach to individualization described in the manual? YES ____ NO ____. Please comment. ____

10. Do you know of any administrative policies, regulations, or procedures that would help to implement the approach to individualization described in the manual? YES ____ NO ____. Please comment.

11. Please describe the type of training a teacher would need to implement the approach to individualization described in the manual.

12. What type of training would an administrator need to help implement the approach to individualization described in the manual?

13. Please make any other comments or suggestions regarding the approach to individualization described in the manual.

III. DISSEMINATION/DIFFUSION

1. What do you see as major stumbling blocks to the adoption or adaption of the approach to individualization described in the manual? Please be as specific as possible.

2. Diffusion of the approach to individualization described in the manual will most likely involve some sort of training. Can you give us your ideas on the diffusion potential of the following types of training:

   Inservice training for teachers?

   Inservice training for administrators?

   Preservice training for teachers?

Demonstration or model schools or classrooms? ____________________

Workshops? ____________________

Other type of training? ____________________

IV. OVERALL EVALUATION AND SUMMARY COMMENTS

Please use these pages to give us any other input you think relevant--about the project in general, the manual, staff, or anything that you wish to comment on.

Thank you for your cooperation.

APPENDIX N

DELIVERING COMPETENCY-BASED VOCATIONAL EDUCATION: A TEACHER'S GUIDE TO INDIVIDUALIZING INSTRUCTION

(See Manual Attached at End of Report)

APPENDIX O

INDIVIDUALIZATION OF INSTRUCTION FOR SPECIAL GROUPS: MAJOR BASES

BY BARBARA JOHNSON

APPENDIX O

INDIVIDUALIZATION OF INSTRUCTION FOR SPECIAL GROUPS: MAJOR BASES

by Barbara Johnson

No other part of the education system has come as far as vocational-technical education in meeting the needs of individuals in special groups for supportive services (Wall, Note 1). This area of individualization is clearly a major strength, since without the strategic matching of services to the needs of the potential learner, most candidates in special groups would remain outside the educational setting. Having developed this strength in individualization, vocational-technical education is increasingly in need of further individualization techniques--those that will change any part of the actual instruction to meet the learning needs of a participant. This chapter addresses the major bases for accommodating members of special groups according to individual needs in vocational-technical instruction.

These major bases will be described in the context of a curriculum model for two reasons. First, a curriculum model offers a familiar structure through which to conceptualize individualization; most teachers have been introduced to curriculum models by the end of their first year of teaching. Second, examining each component of a curriculum model for individualization techniques insures a complete review of the possibilities for use of individualization, since curriculum models are pervasive overviews of instruction.

The major bases presented here are framed by the Taba (1962) curriculum model, composed of goals, performance objectives and tests, learning experiences, learning strategies, learning organization, and evaluation. Each of these will be briefly defined here in relation to this individualization model, prior to more detailed descriptions in the following pages.

Goals. The goal to be considered in individualizing is the goal the individual learner has in entering the system. Individualizing in the goals area can be based on learner preference, vocational interest inventories, achievement tests, and job ability assessments. Career education and counseling for special groups should be utilized to provide knowledge for use in personal selection of goals.

Performance objectives. Performance objectives for the instructional setting are increasingly being derived from job tasks verified by occupational surveys. The learner who passes criterion referenced tests on these performance objectives should be able to perform satisfactory work in the chosen job. Objectives are now being examined for their attainability by members of a variety of special groups.

Learning experiences. A third major area of individualization is in the learning experiences provided for the learner which aid him or her in becoming competent in the performance. Learning experiences are made up of instructional activities in many media, a way of accommodating preferences and needs in special groups.

Learning strategies. Learner differences suggest that some techniques can be used in the instructional management system, and some can be provided in the learning experiences. Contingency management is an example of a management technique; redundancy in materials presentation is an example of individualizing within the learning experience. The first is a technique used for motivating the disadvantaged learner in many cases; the second has been found effective with low mental ability learners.

Learning organization. The sequence of performance objectives in an individual's program and the sequence of events in his learning experiences can be individualized. For the economically disadvantaged learner, early employable skills may meet financial need.

Evaluation. The use of criterion-referenced tests for deciding on a learner's competence individualizes instruction, since he continues in learning experiences until the test results show competence. Additionally, refinements in an individualized program by evaluation of it are essential to meeting learner needs.

The individualization techniques mapped onto these six curriculum components were derived from an extensive literature review and from observation of approximately 250 vocational-technical instructors in their laboratories. All techniques found in the literature and observations logically fell into the curriculum model structure as it is described below.

Goals

For the purposes of individualization of instruction, the term "goal" refers to the expressed aim of the learner in entering the educational system. He may have a short-term aim, such as acquiring the skills to prepare an autobody for repainting. Or he may express the long-term goal of becoming an autobody painter. Both of these goals are judged attainable for individuals handicapped by deafness, for example. High level skill in autobody painting has also been attained by severely educationally disadvantaged individuals. Genuine goal individualization--the selection of a goal matching each individual's expressed aim--depends on the enlargement of training and job opportunities for these groups. An individual whose choice of goal is limited to two or three course offerings has little chance at a genuinely individual choice. Real goal individualization depends on an array of training and job opportunities, and sufficient information about the job and the individual to provide a match.

If this optimal individualization for special group members is to be real, efforts such as that underway by the Vocational-Technical Consortium of States (V-TECS) (Note 2) will be critical. V-TECS member states conduct occupational surveys to determine what skills are essential for job entry level in a variety of occupations: food services, secretary, turfgrass management, ornamental horticulture, and so on. As these surveys are completed and the resulting catalogs of performance objectives disseminated, V-TECS proposes to have certain catalogs reviewed by experts in special groups areas (V-TECS, Note 3). The intent of the V-TECS plan is to test the feasibility of adapting the catalogs for use in occupational training programs for the handicapped. For each catalog, a committee of experts decides the extent to which the performances and standards can be reached by members of a selected group.

An example of the V-TECS procedure is the examination by a committee designated in the State of Florida (State of Florida, Note 4). The occupational area selected for review is autobody repair and refinishing for the prelingually deaf, adventitiously deaf, and hard of hearing. The audially handicapped are often multiple handicapped, particularly in speech. The rationale for selecting autobody repair for the deaf included the elimination of noise as a nuisance factor, little need for interworker communication, limited existing training programs, and continuing demand for workers in the field.

Committee review of the V-TECS catalog of performance objectives showed that the majority of these objectives can be mastered to the required standard by the deaf. This decision, then, adds autobody repair and refinishing as potential goals for those handicapped by hearing loss, and the goal can be set in the community educational setting as well as the institutional setting. The V-TECS computer system can produce, on request of a member state, a list of those objectives appropriate and attainable for the deaf, and community schools can implement such training.

In like manner, other goals and their performance objectives appropriate and attainable for other special groups can be supplied to educational systems so that a broad base of occupational areas opens to the handicapped and disadvantaged. Although a limited effort has been made to review performance objectives for attainment by special groups, V-TECS is apparently the first such project to develop those objectives and goals directly from occupational surveys. It is this aspect that assures the realism of the goals presented to special group members for their individual selection.

As these catalogs are examined, every job area judged masterable by individuals in special groups (e.g., autobody refinishing performance, can be mastered by the deaf) can be added to the list of potential vocational-technical goals for individuals in special groups.

Development and Implementation of Individualized Goal-Setting

Before a vocational-technical instructor can help a learner in individualized goal setting, he needs three kinds of information: personal information on the student, job-related information, and information on market needs and opportunities. For the handicapped or disadvantaged individual, it is especially important to know other strengths and weaknesses, aptitudes and capabilities, and interests and needs, as well as the constraints or opportunities involved in the handicap. The instructor can supply much job-related information, such as knowledge of prerequisite skills, awareness of the main tasks associated with the jobs, work conditions and characteristics, training requirements, and so on. Additionally, the instructor should be able to inform the individual of the current market needs and opportunities

Given these areas of information, the instructor and the learner can arrive at a goal which is as realistic for the particular individual as possible. The learner is then ready to enter the instructional setting, where individualization takes numerous forms.

Performance Objectives

A performance objective, as it is written in the V-TECS catalogs, is an instructional representation of a job task. An objective for the instructional setting, particularly like these based on real data from occupational surveys, is the driving element of the individualized system. They are of major importance to the instructor and the individual in deciding what competencies will be required for the learner to meet his goal. They are also of primary importance in developing and using other parts of the individualized instructional system. Each objective must specify behavior that can be measured by test (oral, written, or performance). Secondly, the properly prepared objective clearly states the limits and/or conditions of student performance: what does the learner have to work with? tools? notes? technical manuals or checklists? and so on. The third requirement for a well-prepared objective is clearly stated standard of performance. An example from the V-TECS food services catalog (V-TECS, Note 5) is:

"Given a standardized recipe, necessary ingredients, and equipment, prepared the following types of sandwiches: cold, toasted, and grilled. A standardized product should result; performance will be judged by the instructor."

The catalog that contains all performance necessary for job entry in the food services field is the operational list of skills the learner must master to meet his goal; they are the basis for developing all other components of competency-based instruction. If the performance objectives are unnecessary, inadequate, or inaccurate, all of the remaining effort put into instructing the individual becomes potentially wasteful.

Operationalizing Individualization by Performance Objectives

What has traditionally been called a "course of study" can be highly and effectively individualized for the special group member by selecting all, but only, those performance objectives that are necessary for his own goal. The individual and the instructional system use time and resources most effectively when only necessary skills are instructed for. Once an individual has chosen a goal, the instructor can accurately describe the needed instruction by selecting the performance objectives that together comprise the set of skills required for the job. This set may be all of the objectives necessary to become a food service worker, if that is the individual's goal, or it may be some lesser set of objectives for a short-term goal. The current V-TECS catalog lists eight duties for job entry in food services, with 2 to 46 tasks under each duty, as shown in Table 1.

Insert Table 1 about here

The total of 89 job tasks indicates that there are 89 performance objectives for the instructional setting in the catalog, one for each task. All of these 89 objectives might be judged attainable by some special groups; for example, the educationally disadvantaged. The disadvantaged individual with the goal of food service worker would

Table 1

Duties and Tasks in Food Processing

Catalog of Performance Objectives

Duty	Number of Tasks
Organizing and Planning	10
Directing and Implementing	6
Inspecting and Evaluating	3
Maintaining Forms, Records, Reports	3
Preparing Food for Cooking or Serving	15
Cooking Food	46
Prepare Serving Lines	2
Cleaning and Maintaining Dining Hall and Kitchen Equipment	4

then begin to master all 89 of the performance objectives in some sequence suitable to his own needs.

If, however, the disadvantaged individual has the opportunity and the need to begin work as a grill cook, he can begin to master only the skills that are listed for that job. The instructor, as subject matter expert, selects the objectives from the catalog that are necessary for this short-term goal, and thereby individualizes the individual's course of instruction by individualizing performance objectives.

Developing Individualized Instruction with Performance Objectives

Implementing individualization through performance objectives, as just described, is certainly the less onerous of the two ways to use performance objectives in the individualized setting. The second way, development of instruction, is a time-consuming and resource-consuming process. In order to develop instructional materials that meet the needs of individuals in special groups, an extraordinarily fine-grained analysis of the performance objectives is necessary. This means that the instructional task analysis, breaking down the objective into a list of "must do" and "must know" items, is more demanding and laborious for the needs of special groups than for more general instruction. The more detailed the analysis of the "must do" and "must know" requirements that will lead to mastery of the performance objective, the more likely it is that the instruction can be tailored to individual needs in special groups.

An example of a performance objective broken down into "must knows" and "must dos" is taken from curriculum materials developed for the educable mentally retarded in Sarasota County, Florida (Florida Department of Education, Note 6). The task for the unit is "Sandwich Maker," and the subtask addressed in the printed unit is "Prepare Club Sandwich," shown in Table 2.

Insert Table 2 about here

All "must knows" and "must dos" can then be translated into performance objectives with behavior conditions, and standards.

Two major purposes are served by preparing an analysis that contains this great detail. First, the instructional materials that are developed to promote mastery of the objectives are based on small learning steps that provide advantages for learners in need of quick success. Second, it is easier to determine what the learner already knows through matching criterion-referenced tests, and to by-pass instruction for this. The EMR learner who has come into the instructional setting already capable of making toast can start at a different level in the lesson than the one who did not, thereby suiting his instruction to him. Some learners may have entered instruction already capable of making a toasted sandwich, but not a grilled sandwich. This would allow individualization at a different level of pretesting (lesson vs. unit), saving time and resources for both the individual and the system.

In addition to individualizing through pretesting, criterion-referenced tests can be used in the laboratory as posttests permitting

Table 2

Analysis for Subtasks in Food Services Performance Objective for Educable Mentally Retarded Learners

Sub-Task Analysis	
Do	Know
1. Place bread in toaster	a. Where toaster is located
	b. Where bread is located
	c. How to operate toaster.
	d. When to put bread in toaster.
	e. How much bread to use.
2. Prepare cutting board for toast.	a. Where cutting board is located.
	b. When to prepare bread.
	c. How to prepare bread.
3. Remove toast from toaster.	a. When bread is ready to remove
	b. How to remove toast from toaster.
4. Place toast on cutting board.	a. How to arrange toast on board.
5. Spread toast with mayonnaise.	a. How much mayonnaise to use.
	b. How to spread on toast.
	c. Where to spread mayonnaise.
6. Spread chicken salad on toast.	a. How much salad to use.
	b. Which slice of toast to spread with salad.
	c. How to spread salad on toast.

Table 2 - continued

Analysis for Subtasks in Food Services Performance

Objective for Educable Mentally Retarded Learners

Sub-Task Analysis Do	 Know
	d. When to spread salad on toast.
7. Place slice of toast on top of chicken salad.	a. When to place toast on chicken salad.
	b. How to place toast on chicken salad.
8. Place sliced tomatoes on toast.	a. How many slices to use.
	b. Where to place slices on toast.
	c. Which slice of toast to place tomatoes on.
9. Place bacon on tomatoes.	a. How much bacon to use.
	b. How to place bacon on tomatoes.
	c. When to place bacon on tomatoes.
10. Place lettuce on bacon.	a. When to place lettuce on bacon.
	b. How much lettuce to use.
	c. How to place lettuce on bacon.
11. Place slice of toast on lettuce.	a. When to use toast.
	b. How to place toast on lettuce.

Table 2 - continued

Analysis for Subtasks in Food Services Performance

Objective for Educable Mentally Retarded Learners

Sub-Task Analysis Do	 Know
	c. Which toast to use.
12. Place toothpicks in sandwich.	a. How to place toothpicks on sandwich.
	b. Where to place toothpicks on sandwich.
	c. How many toothpicks to place on sandwich.
13. Cut sandwich.	a. When to cut sandwich.
	b. How to cut sandwich.
	c. How to cut desired portions.
14. Place sandwich on plate.	a. When to place sandwich on plate.
	b. Which plate to use.
	c. How to arrange sandwich on plate.
15. Place pickles on plate.	a. When to place pickles on plate.
	b. How many pickles are used on plate.
	c. How to place pickles on plate.
16. Place potato chips on plate.	a. When to place chips on plate.
	b. How to place chips on plate.
	c. Where to place chips on plate

diagnosis of learning difficulties and/or master that permit the instructor to meet the learner's needs. If the posttest indicates complete mastery of the skill, the instructor can decide to motivate or reward the learner by making him a peer tutor, or other contingency, rather than the usual progression of instruction into the next objective. If mastery is attained, but not 100%, it is possible to keep track of the items missed over one or more tests to determine whether or not one weak skill can be bolstered. If several criterion-referenced tests indicate mastery but show some inadequacy in slicing, for example, extra practice in slicing can be instituted for the learner. This is an instance of individualizing through a checklist showing mastery.

The unmastered posttest should also lead to individualized instruction. In the past, the tendency has been to move the learner back to the beginning of the instructional sequence, instead of providing for him only instruction that would provide skill in the areas in which he did not achieve mastery. If he shows check marks on all of a performance checklist except in the spreading of chicken salad on the toast, the emphasis in instruction should be on spreading know-how, and not on creating the entire performance again.

Criterion-referenced tests provide real opportunities for individualization for members of special groups, then, in several ways. Their development is finding where problem spots are in instruction is simpler when the steps are small--"how to toast bread" is a much more difficult diagnostic problem to solve than each one of the 11 steps listed in the "know" column above under "Place bread in toaster" through "Place toast on cutting board."

Given the list of "lowest level" objectives (highest level being the sandwich maker objective), development of individualized instructional programs proceeds in two separate ways: (1) with the development of learning experiences in one or more media, to deliver the instructional content to the learner, and (2) with the development of criterion-referenced tests, to assure that the learner has mastered the competency required of him. Development and implementation of individualization through criterion-referenced tests will be discussed here first.

Criterion-Referenced Tests

A criterion-referenced test confines itself to the performance described in the performance objective, and insures that the performance takes place under the conditions described in the objective. It permits the test administrator to judge whether the standards for satisfactory performance have been met. Wall (Note 1) suggests that "Criterion-referenced tests, which determine how much of a specific body of knowledge a person has learned, should supplement--or possibly replace--nationally standardized (norm-referenced) tests, which merely compare one person's level of achievement with that of another." A major reason for the advantage of criterion-referenced testing for special groups is that every individual is instructed until he reaches criterion, which means success, a condition often lacking in the traditional program.

Since test items can be developed to exactly match the requirements of each "must know, must do" performance objective, the finely detailed breakdown of these objectives permits diagnostic use of the tests. It is quickly possible to tell, for example, that the individual's only problem is how many tomato slices to use, grading on a checklist. Since these tests then reveal what an individual has mastered, and what he has not mastered, they can be used to individualize both before and after instruction. Used as pretests, they individualize by allowing the instructor a specialized procedure that requires the writing, validation, rewriting, and continued revision of items that will provide diagnostic information as well as clearly indicate the mastery of the performance objective. These may be verbal tests or performance tests with rating scales, checklists, and so on.

When both the performance objectives and the criterion-referenced tests are available for the development of individualized instruction, learning experiences can be developed to provide mastery performance (as assessed by the criterion-referenced test) for the learner in the special group.

Learning Experiences

Vocational instruction systems now have a powerful array of media available to them, and these media can help individualize instruction for special groups. Media can be thought of as "delivery systems" for instructional messages--in the past, the instructor was the delivery system. Now he is one medium in a set of possible media including the actual object, audio, other human resources, motion visuals, print, and still visuals. Each of these may suit the needs and/or preferences of the special learner, such as audiotapes for the educationally disadvantaged, actual objects for the visually handicapped, motion visuals for the deaf, and so on.

The problem faced by the individual developing instruction is choosing the set of media that will best help learners master objectives. After that the developer is faced with the production of these learning experiences in the chosen media, using strategies that allow learners to reach competence in the skill. A learning experience can be defined as a set of mediated instructional activities developed on one or more performance objectives, designed to lead the learner to mastery of the performance(s). Developing individualized instructional resources for the handicapped and disadvantaged is based on the following:

1. Learning experiences leading to mastery of an objective can be developed in a variety of media. Supplying a variety of mediated learning experiences is important to individualized instruction because different media meet different needs or preferences of individuals.

2. Print is the least expensive medium, and is the medium the learner can most easily control for his own needs. Therefore, it can be considered first in the selection of media for all those who can use it. (Braille would be considered print.)

3. Media other than print vary on a scale of cost and learner control, and can be chosen on those bases in addition to the considerations of learner special needs.

4. Actual assessment of a performance objective, a part of each learning experience, will most often demand use of real objects.

Developing Individualized Learning Experiences

Competency-based vocational education for special groups demands individualization, and individualization demands a variety of learning experiences, mediated to meet needs of the handicapped and disadvantaged. Media can be grouped, for description, into six classes: actual objects, audio, human resources, motion visual, print, and still visual. Each of these has characteristics which recommend it for special groups:

Actual objects include real engines, or store counter mockups, or simulated airplane cockpits, and so on. Actual objects are widely used in vocational-technical education, so that the individual learner can have hands-on experience in job tasks, a technique often recommended for the disadvantaged. Autobody repair, automechanics, airplane mechanics, electronics shops, and business education settings show a variety of simulators and real objects being used in instruction. Actual objects have the advantages for special group learners of being realistic and therefore relevant to their perceptions of their needs, and of being alterable for easier observation. They can be reduced or enlarged for study, or can be adjusted so that nonessentials are omitted.

Auditory media include such things as disk and tape recordings. An audiotape can be used by an individual with a speech problem, for example, to learn to say a set of technical words. In some training settings, small cassette players with earphones are used to direct an individual in a series of steps, such as learning the locations, names, and uses of a set of equipment in a laboratory. For poor readers, an audiotape can be used as an aid with, or as a substitute for, difficult textual materials.

Human resources can be used as instructional experiences, including tutoring with instructors, with other learners, or with community resource persons. Some evidence exists that the slower learners and the disadvantaged benefit by motivation and more efficient learning with a peer tutorial system in the instructional setting. Of particular value in special groups is the fact that one-to-one tutor-learner ratio provides close control over dangerous operations preventing injury to the operator or damage to the equipment.

Motion visuals, such as moving pictures, can be used when motion is an important part of a task. Assembling or dissassembling a piece of machinery, participating in a team task, or showing important attitudes on the job are among the tasks that are suited to motion visual media. Motion visual without sound can be programmed effectively to demonstrate a performance for the deaf. For learners requiring redundancy and structure, motion visuals can be used to introduce and overview a subject, and to summarize content presented by other means.

Print includes instruction in books, manuals, periodicals, pamphlets, handouts, and so on. Print is an excellent medium for much background information, and for repeatedly useful instruction. Examples are books on electronics and radio repair, and job aids such as step-by-step instructions for operating a piece of equipment.

Still visuals, such as pictures, drawings, symbols, and/or word combinations, are seen in instruction in the form of posters and diagrams, for example. They are useful in many learning tasks such as those involved in solid state circuitry or house wiring. For the educable mentally retarded, still visuals in step-by-step progression might be preferable to step-by-step printed instructions in the making of a sandwich. Augmenting print materials with well-developed graphics, or augmenting graphics with an audiotape, provides a combination of media which might aid learning with disadvantaged learners or educable mentally retarded.

All of the media described are available in the vocational-technical school, to some extent, and most are usable by members of all special groups. Practicalities of cost and learner control are of major importance in deciding which media to use in developing a complete learning experience. In developing more than one learning experience for an objective, the practical approach is to begin with the lowest cost, highest learner control, and move toward the opposite, as shown in Table 3.

Insert Table 3 about here

Since a complete learning experience should account for all nine events of instruction as listed by Gagne and Briggs (1974), some medium can be designated to provide the delivery system for each event (These events are not necessarily ordered sequentially as they are used in the example.) Thus, in providing three different learning experiences for one objective, for example, "prepare toast for a club sandwich," media selections can be mapped onto a list of the events as shown in Table 4.

Table 3

Relative Cost and Learner Controlability of Media by Category

Media Category	Cost/Control
PRINT (books, manuals, periodicals, pamphlets regulations, directives, handouts, job aids, etc.)	low cost; easiest medium for learner to use at his own pace, move back and forth at will, etc.
AUDIO (disc and/or tape recordings)	low cost; slightly more difficult for learner to control than print.
STILL VISUALS (incidental or prepared graphics, slides, transparencies, filmstrips)	generally higher cost than print alone; learner control constricted by limited content.
HUMAN INTERACTIONS (instructors, peers, student proctors, community tutors)	cost varies from nothing to cost of instructor time; controllable by learner to extent of question and answer, subject to interpersonal constraints.
MOTION VISUALS (videotape, motion pictures, with audio)	highest cost other than some actual objects; lowest learner control.
ACTUAL OBJECTS (real object, models)	cost varies from nothing to high; learner control generally good.

Insert Table 4 about here

The three learning experiences in Table 4 may be developed to cover exactly the same material in the same way, so that the graphics and the audiotape match the print closely or exactly. (Strategies for different types of materials development will be discussed in a later section of the chapter.) Thus, in actual use in a classroom for the educable mentally retarded, all learners approaching this objective have options: (1) to choose the favored medium; (2) to be assigned to the medium observed by the instructor to be most helpful to that individual; (3) cycle through one experience after another until mastery is attained; (4) use a simultaneous combination of print and graphics, print and audio, or audio and graphics. For performance objectives, the use of actual objects and human resources in assessment is generally required.

It appears that there are two major reasons for providing learning experiences developed for the same objective, but in varied media: (1) The learner has an option, which can motivate him to make a choice. If the individual likes to hear audio along with print materials, or if he likes graphics very much, he can be motivated by making his choice to suit his preference. (2) Instructors may be able to diagnose that some individuals learn faster or reach competence at a more satisfactory level by using one medium or combination of media. Some learners can move faster with audiotape plus print, while others may be bothered by print in any event. For

Table 4

Varying a Learning Experience by Media/Events of Instruction

Events of Instruction	Learning Exp 1	Learning Exp 2	Learning Exp 3
1. gain attention	print	graphics	audio
2. inform of objective	print	graphics	audio
3. recall relevant learning	print	graphics	audio
4. present material	print	graphics	audio
5. provide learning guidance	print	graphics	audio
6. give chance to perform	print/ human resource	human resource	audio
7. give information on performance	actual object	actual object	actual object
8. assess performance	actual object/ human resource	actual object/ human resource	actual object/ human resource
9. provide for retention and transfer	print, human resource	print, human resource	audio, print, human resource

these main reasons, learning experiences mediated in more than one way are aids to individualization both by learner choice and by instructor prescription.

Deciding which media to use for instructional packages (or learning experiences) is only one part of the development process. For individualization, it is equally important to design materials which are varied to meet the needs of learners with different learning strategies. Some of the developmental and implementation implications of learning strategies are covered next.

Learning Strategies

In a competency-based educational system, the main reason for individualizing instruction is that learners differ in ability to learn, style of learning, and motivation to learn. Each learner's ability, style, and motivation determine his individual learning strategy. Learning strategies are skills that the learner uses to organize his behavior in a learning situation. For example, when learning a complex task, some individuals may prefer to break the task down into smaller, less complex parts, each of which is learned prior to learning the whole task. Other individuals may prefer to learn the complex task as a whole.

A basic assumption of individualized instruction is that the learning process will be helped if the learner's strategies are taken into consideration. It is the learning manager's task to try to provide learning experiences that are consistent with the learner's strategies. These learning experiences should be composed of instructional events that are tailored to meet the instructional needs of individual learners.

In any area of instruction--whether mathematics, history, industrial arts, or auto mechanics--different parts of the learning experience must be designed to serve different functions. Some of the main functions to be fulfilled in any learning experience are (1) securing the learner's attention, (2) informing him of his objective, and (3) helping him to remember relevant things already learned. Other parts of the learning experience (4) present the material the individual must learn, (5) provide guidance for him in the learning situation, and (6) give him a chance both to perform and (7) to receive and understand information (get feedback) about his performance. Parts of the learning experience are also provided (8) to assess the performance, and (9) to help with retaining and transferring the skills and knowledges.

Handicapped learners may have specific problems, such as those imposed by hearing or visual impairments, or by capacity to learn more slowly than other individuals. Many disadvantaged and handicapped learners appear to share the socio-psychological characteristics listed by Johnson (Note 7):

1. a history of failure with a defeatist attitude and an extreme need for motivation to learn;
2. negative attitude toward school atmosphere;
3. immaturity, inability to start and finish, no personal responsibility, insecurity;
4. dependency (low self-concept);
5. suspiciousness or distrust, and need for quick success.

These characteristics of learners in special groups can be usefully accounted for by employing various strategies to individualize. Allen (1975) has translated the findings from a review of research on media-design intellectual ability relationships into prescriptions for the actual development of instructional materials.

In designing instructional materials for learners of low mental ability, Allen suggests:

"Preparatory or motivational procedures that establish a set to learn the material to follow . . .

"Organizational outlines or internal structuring of the content . . .

"Attention-directing devices that point out, emphasize, or direct attention to relevant cues in the communication . . .

"Procedures that elicit active participation and response from the learner to the content of the communication . . .

"Provision for correcting or confirming feedback elicited from learners . . .

"A slow rate of development or pace of presentation of the content to be learned . . .

"Formats that provide for supplementation or replacement of the mental processing operations, normally done by the learners, by means of imitation or modeling . . .

Materials for average mental ability are to be developed much like those for low, while suggestions for high-ability learners are:

"Higher information density, pictorial and conceptual complexity, and richness in images, ideas, and relationships . . .

"Rapid rate of development of information and concepts being communicated . . .

"A format that places requirements on the learner to organize, hypothesize, abstract, and manipulate the stimuli mentally in order to extract meaning from it . . . ."

Relationships of all mental ability groups and media-design listed in Allen's paper are also relevant to individualizing by strategy for members of special groups. A learning experience developed in a variety of ways according to the strategies for low-, medium-, and high-intellectual ability groups would serve diverse needs in a vocational-technical setting.

Some instructional activities to meet these and other needs of handicapped/disadvantaged learners can be written into the learning materials; for instance, the guidance function can be adjusted by varying the hints, cues, prompts, etc., or by using programmed instruction to provide immediate feedback. Other instructional activities--those which center on the use of tutors, pacing individual variations, and contingency management (a plan of rewards for desired performance)--are not necessarily tied to the materials and media. Many disadvantaged learners may be so poorly motivated that the use of concrete rewards for correct performance might have to be used to gain attention, or to get them to perform (Homme, 1969). Disadvantaged learners also might find it difficult to interact with the instructor, so that a great deal of instruction for those learners could profitably be carried out through the use of peer tutors. The tutor could then carry out all the activities of the learning experience, including providing feedback on performance, and testing.

Variations in the rate of instruction can be incorporated into the learning experiences themselves, or can be managed through either self-pacing or instructor pacing. Learners with less than average ability may require more guidance, feedback, and structure in general, thus making instructor pacing more desirable. The use of this instructor-managed pacing might be accomplished through a peer tutor, in a contingency-managed system.

Given learning experiences varied to meet the needs of learners in any special group, the instructor is faced with the need to sequence these experiences for the individual's requirements.

Learning Organization

The components of instruction--goals, objectives, learning experiences, and strategies--must be organized in some way meaningful to the learner. Especially for members of special groups, the sequence of instruction should suit the need or preference of the learner. In individualizing goal sequences, for example, a physically handicapped individual may have financial needs that make it essential for him to have job entry skills in bank telling so he can work as he moves on to a vocational goal requiring further training. In short-term goals, again, a financial need may be met by a learner acquiring skills to be a salad maker and getting a job, but continuing to learn other food service skills to increase employability potential.

In sequencing performance objectives, instructors are obligated to decide which skills must be mastered before others, and give this information to learners. Outside of the sequence requirements imposed by this, learners can then be free to choose according to their interests. Disadvantaged individuals have been shown to be motivated by "hands-on" objectives before theory. A major problem in this area of individualization is that in many cases objectives are viewed as "prerequisite skills" to others when in fact they are independent. Some courses of study list learning to remove dents from a fender as prerequisite to learning to refinish a fender, confusing the job performance sequence with instructional sequence. In all cases where requirements are kept to a minimum, individualization of objectives' sequence can occur for motivation and interest.

A third level of learning organization is through events of instruction. Regardless of the general organization of a learning experience intended to lead to skill mastery, the immediate need of a learner may suggest that the instructor reorder the events of instruction. An educable mentally retarded learner may show need for activities providing more learning guidance and more practice after self-assessment. The instructor may diagnose a need for describing relevance to other instruction at a trouble spot, or may see a need for transfer of previous training in new skill instruction.

At some point before leaving the instructional setting, it is particularly important for members of special groups to practice total job performance. The characteristics of special groups (low self-concept, inability to start and finish, etc.) suggest that instructional sequences for each individual be organized to give the learner ample time to practice the total job in situations closely approximating the conditions he will face on the job.

Evaluation

Evaluation for special groups in a competency-based system must perform two different functions. First, the learner's competence is measured by criterion-referenced measures on performance objectives. Second, the effectiveness of the educational system in producing competent workers is judged by how well handicapped or disadvantaged individuals do on the job after leaving the system.

In the first kind of evaluation, criterion-referenced measures are used to find out if the learner is competent in the performance. This kind of information is used for two purposes. The instructor uses criterion-referenced measures to decide whether or not the student has learned from the experience so that he, as instructor, can prescribe instruction of some kind--if necessary additional learning experiences for mastery of the same performance, or, if the learner has attained competence in the prescribed performance, new experiences intended to help him reach competence in another objective. By keeping records of this information, the instructor can pinpoint which learning experiences are most effective in promoting competence. By recording the number of attempts each learner makes before passing his criterion-referenced measures, and by pooling this information for all his learners, the manager can locate specific parts of the instructional program that are not maximally effective, and can then make decisions for improving those parts. If members of a specific group--e.g., mentally retarded or visually handicapped--are consistently having difficulty in passing mastery tests, the test and/or the instruction is suspect. Diagnostic items can be inspected for obvious failings--poor wording, too complex performance dependence on vision, etc. The learning experiences for the "must know" objectives may be shown inadequate for the group if learners fail the knowledge test items. For the failed "must do" items, all features of the product or steps of the procedure to be mastered are possibilities for locating the source of instructional difficulty. Thus, by testing diagnostically the instructor can, for special group members, refine the learning experiences to accommodate individual needs.

The second kind of evaluation is a way of monitoring the educational system in order to judge whether or not the performance objectives are both necessary and adequate for competent job performance. This kind of evaluation requires collecting information from on-the-job supervisors of graduates and using the collected information to make any changes in the educational system that are necessary to produce more competent workers. The close contact between the instructional system and the job market is particularly critical to the handicapped and disadvantaged. Individuals in special groups will find their employment needs met increasingly as each graduate proves his competence on the job.

Summary

Enlarging vocational goal choices for members of special groups is a priority in individualizing instruction. Regardless of handicap, each individual should be able to choose from as wide as possible a range of work fields. Current moves both inside and outside of the job market are producing systematic investigation of the effects of handicaps on performance of many jobs, with a consequent broadering of both training and employment for members of special groups.

If an individual learner has been able to select a vocational goal meaningful and attainable to him, the individualization of his instruction can be furthered by a careful matching of performance objectives with his goal. His needs are best met when the course of instruction includes all of the skills he will need to perform on the job (each skill represented by a performance objective in his instructional program), but no unneeded skills. Training in unrequired skills lengthens the time the individual remains in the instructional setting instead of placing him in the job market. If he is placed on a job after acquiring unnecessary skills, those skills have been shown to perish from disuse. From the individual's point of view, the closest match of instructional performance objectives with his goal meets his needs most satisfactorily. In terms of the educational system, this is also optimal, since it produces qualified workers without wasteful use of system resources.

For maximum individualization in the performance objective area, the instructor can pretest the learner, either over the entire set of objectives should he believe that the learner is entering with some skills, or over some subset. Thus, the learner who already knows the required tools, or operation of a machine, etc., can have his instructional program more finely tailored. Instructional time will be spent only on unmastered skills.

Further tailoring is accomplished at the lesson level using pretest information. Technical terms or calculating skills, for example, or any part of the prescribed learning experience, can be bypassed in instruction when the learner demonstrates mastery in the pretest. Bypassing instruction cuts down on lack of motivation caused by boredom while providing the experience of success, aside from its virtue in saving individual and system resources.

Tests for learners in special groups obviously must be developed with as much care as the instruction itself, and their potential uses in individualization go beyond the pretesting techniques suggested above. Posttests can be used to individualize--that is, the results suggest ways to vary instruction to accommodate individuals. The posttest showing 100% mastery (whether a written or a performance test) may give reason to go through less practice on a related objective, while a mastered, but not perfectly mastered (e.g., 80%) skill may suggest added practice subsequently. A skill demonstrated particularly well may suggest use of that learner as a peer tutor for one working on the instruction for that objective. This can meet motivational, success, and learning needs in disadvantaged individuals, both learner and tutor.

Unmastered skills, as shown by posttest results, also demonstrate a need for individualizing. If the prior instruction failed to produce mastery, what other learning experience or strategy will instruct better for this learner? Is the learner's handicap causing problems, and how can they be alleviated? Carefully designed and used tests are vital individualizers--they can focus on trouble spots and thereby suggest adaptations in instruction.

Just as performance objectives in instruction form the basis for criterion-referenced testing, they form the basis for development of learning experiences--instruction that will lead to their mastery. Learning experiences can be delivered to the individual in any one, or any combination of, six media: actual objects, audio, human resources, motion visuals, still visuals, and print. Handicaps have obvious implications for individualization by media; less obvious but as important are the uses of media to meet needs and preferences of individuals. The learner who needs or prefers to hear rather than to read information should find audiotapes available, not print alone as is often the case. Availability of learning experiences in alternate media leading to mastery of one performance objective is a critical resource in individualizing instruction for special groups.

Psycho-social, intellectual, physical, and other differences in individuals suggest that instructional strategies be used to accommodate these characteristics. Given a learning experience in any medium, learners may benefit by varying degrees of redundancy, structure, feedback, practice, and so on. The instructional setting can provide such individualizations as contingency management, individualized pacing techniques, and various tutoring plans.

However many objectives the individual pursues, and whatever variations in learning experiences and strategies, some learner needs and preferences can be met by sequencing the acquisition of skills. Self-sequencing, where possible, may be motivating; core sequencing may provide continued practice; job sequencing may provide gradual inclusion of all job skills as they will be required in actuality.

In order to continally refine the individualized system so that each learner's needs will be accommodated, the instructor has to evaluate instruction--learning experiences--in the light of how well individuals with given characteristics reach mastery. Instructors also are in need of information from the job market that indicates how well the acquired skills have prepared learners to get and keep jobs. Since this was generally the individual's goal in entering the program, the instructional system bears the burden of providing for it.

Conclusion

A model for the individualization of instruction must be able to meet the needs of any and all learners in the instructional setting. So it is entirely appropriate that the curriculum-based model described here can be used to accommodate the needs of learners in special groups as well as those not so classified. Each learner is, after all, a person unlike any other person. Individualization of instruction does not need to take into account why learners are different--it needs to take into account how the differences can be met.

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APPENDIX P

A CURRICULUM-BASED MODEL FOR EXTENDING THE APPLICATIONS OF INDIVIDUALIZATION TECHNIQUES

Barbara Johnson and Robert Fagan

APPENDIX P

A CURRICULUM-BASED MODEL FOR EXTENDING THE APPLICATIONS OF INDIVIDUALIZATION TECHNIQUES[1]

Barbara Johnson[2] and Robert Fagan[3]

When we began the Curriculum Delivery System project[4] 18 months ago, we had two things to go on. One was the task: the development and validation of techniques of individualization for vocational teachers to use in their classroom laboratories. The second was a curriculum model that was to be the basis of the conceptual framework for individualization. The project started with four instructional systems people, and those two things. Now I don't know if you are aware of what happens when you confront instructional developers with a curriculum model. What happens is an indefinite period of pained silence. The same thing, oddly enough, happens when you confront curriculum people with a systems model.

In this case, though, we had the Taba curriculum model as the prescribed individualization framework. The Taba model is pictured in Figure 1. During our moment of silence, we tried to put arrows into the

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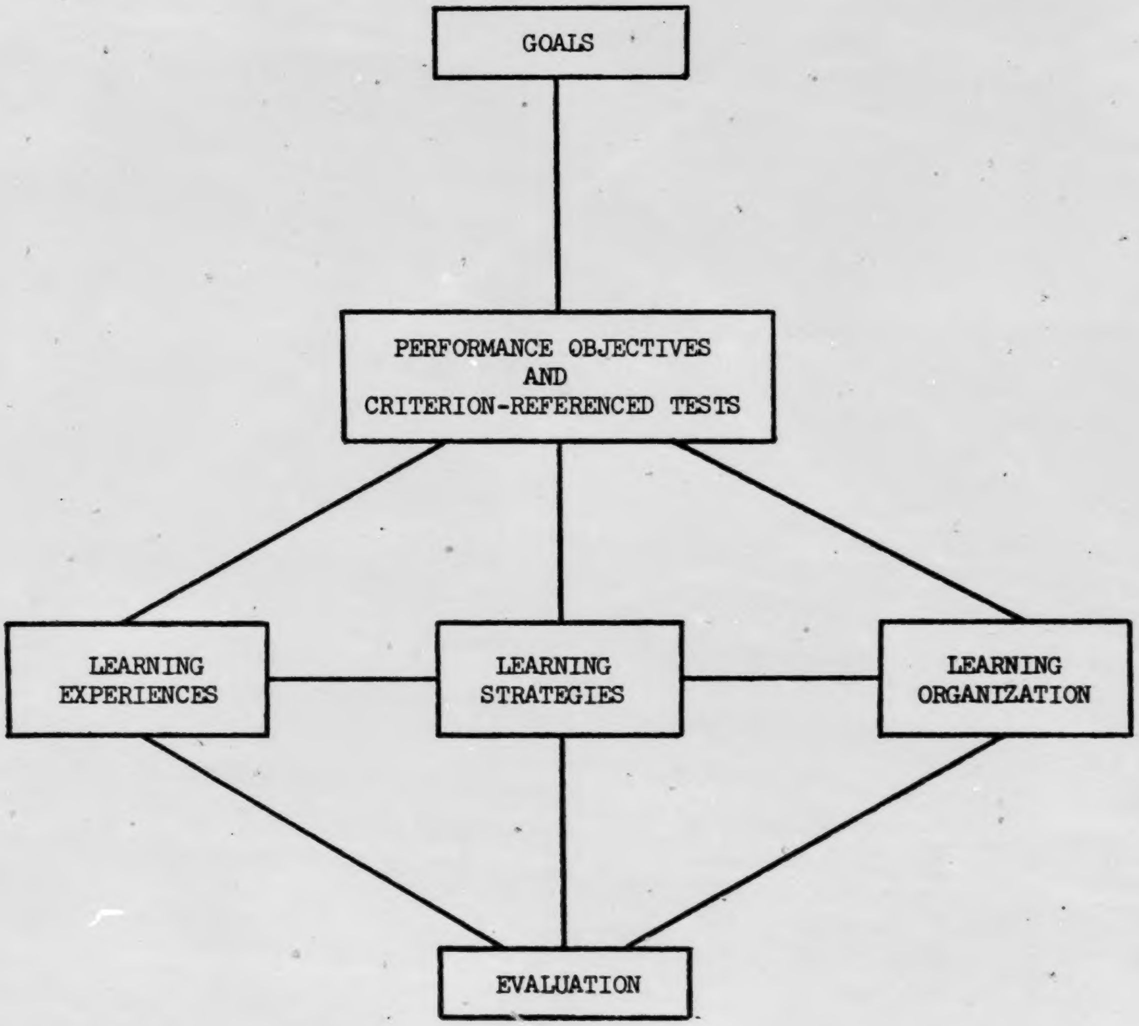
[1] Paper presented at the FERA Annual Conference, Orlando, Florida, January 1976.

[2] Formerly CDS project director, presently at the University of Texas Medical Center, Galveston, Texas.

[3] CDS project research and evaluation coordinator.

[4] Development of a Curriculum Delivery System for Individualizing Instruction in Vocational-Technical Education. Research project in vocational education conducted under Part C of Public Law 90-576. Project No. V0155VZ, Grant No. OEG-0-74-1645.

Figure 1. Graphic Representation of the Curriculum Model


GOALS
PERFORMANCE OBJECTIVES AND CRITERION-REFERENCED TESTS
LEARNING EXPERIENCES
LEARNING STRATEGIES
LEARNING ORGANIZATION
EVALUATION

model, in the hopes it would turn into a systems model. We ran out of arrows. Then we tried putting string on it so it would fly like a kite. That didn't work either. So the next step, the one we'd like to talk with you about today, was to go to two sources to see how individualization techniques can be mapped onto a curriculum model to provide both a developmental and an operational model for individualizing instruction.

The first source we sought out was the literature. There's a lot of literature filed under individualization, and we looked at thousands of abstracts, articles, microfiche, books, and publisher's materials. The second source we went to was the vocational classroom. We went out into Florida vocational laboratories at all levels and in various types of school settings, and observed something like 200 instructors as they managed instruction. We immediately recorded the observed techniques, took the records back to the office, and proceeded to mesh those observations with techniques listed in the literature, and mapped both onto the curriculum model. By then, the silence had entirely thawed, and we had become somewhat monotonously verbal over the comprehensive nature of a curriculum mapping of individualization.

Before the first year of operation was over, we had developed, with a number of fine educators and leading scholars, a framework paper.[5] This conceptualized individualization for us and for instructors and other educators but did not operationalize it in any way. That was the next step, to behaviorally define the individualization techniques, give them to a set of specially selected vocational teachers, and collect data on their use. Working with Educational Testing Services, we came up with the individualization techniques in Table 1, all of which we had located in the literature, or seen in operation in a classroom. This is the list of behaviors that a selected group of Florida vocational teachers is using for self-observation this year in classrooms. Now if we turn this list sideways, we see a diagram of individualization techniques now being validated, as in Figure 2. This is a graphic presentation of the individualization model being fieldtested, and later we can give you this same model in bar graph form, representing the reported amount of use of each technique.

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[5] Copies may be obtained by writing to Project Director, CDS Project, 415 N. Monroe St., Tallahassee, Florida 32306.

Using this graphic representation of the model, let's take a quick look at how individualization techniques reported in the current literature fit into the model. This will give you some idea of the comprehensiveness of the model, and of the fact that almost all, if not all, of the individualization reports in the current literature can be subsumed by this model. Consider these reports, taken from late surveys of the literature:

Case 1: Programmed text. This is a term that is often used as a synonym for individualized instruction, yet if you mark it out on the individualization model as in Figure 3, you find that a programmed text is the use of one medium--print--with contingency management and pacing strategies. Therefore programmed texts are subsumed in the model as one medium and a subset of strategies.

Case 2: Modules. Modules, modular instruction, LAPS, packages, and so on are also terms often used synonymously with individualized

Table 1
Techniques for Individualization

Goals	Assist a student in deciding on a short-term goal.
	Assist a student in deciding on a long-term goal.
Performance Obj.	Match a set of performance objectives to a goal.
Criterion-Referenced Tests	Identify unmastered unit objectives by pretest.
	Identify unmastered lesson objectives by pretest.
	Prescribe instruction by posttest mastery level.
	Prescribe instruction by posttest nonmastery level.
Media Selection	Select print instruction by need or preference.
	Select audio instruction by need or preference.
	Select still visuals by need or preference.
	Select human resources by need or preference.
	Select motion visuals by need or preference.
	Select actual objects by need or preference.
Learning Strategies	Vary events of instruction by need or preference.
	Use peer tutor to meet individual needs.
	Use instructor tutoring to meet individual needs.
	Use advanced student tutor to meet individual needs.
	Use community volunteer to meet individual needs.
	Use instructor pacing to meet individual needs.
	Use student pacing to meet individual needs.
	Use instructor-student pacing to meet individual needs.
	Use proctor-student pacing to meet individual needs.
	Use contingency management to meet individual needs.
Learning Sequencing	Assist in sequencing short-term goals.
	Vary sequence of objectives to meet individual needs.
	Vary sequence of lessons or topics to meet needs.

Goals	Short-term
	Long-term
Performance Obj.	Match to goal
Criterion-Referenced Tests	Unit pretest
	Lesson pretest
	Posttest/mastery
	Posttest/nonmastery
Media Selection	Print
	Audio
	Still visual
	Human resources
	Motion visual
	Actual object
Learning Strategies	Vary events
	Peer tutor
	Instructor tutor
	Advanced student tutor
	Community volunteer tutor
	Instructor pacing
	Student pacing
	Instructor-student pacing
	Proctor-student pacing
	Contingency management
Learning Sequencing	Short-term goal sequence
	Objective sequence
	Lesson sequence

Figure 2. Graphic Presentation of the Individualization Model

Figure 3. Individualization Techniques in Case 1 (Programmed Text)

Goals	Short-term
	Long-term
Performance Obj.	Match to goal
Criterion-Referenced Tests	Unit pretest
	Lesson pretest
	Posttest/mastery
	Posttest/nonmastery
Media Selection	▨ Print
	Audio
	Still visual
	Human resources
	Motion visual
	Actual object
Learning Strategies	Vary events
	Peer tutor
	Instructor tutor
	Advanced student tutor
	Community volunteer tutor
	Instructor pacing
	▨ Student pacing
	Instructor-student pacing
	Proctor-student pacing
	▨ Contingency management
Learning Sequencing	Short-term goal sequence
	Objective sequence
	Lesson sequence

instruction. Minimally, they are subsumed by print media and some type of strategy, as in Figure 4. The most complex modules may incorporate objectives and tests, and suggestions for varied learning experiences. Actually, modules appear to be the most promising basis for systematically implementing individualized instruction, although we do not find in the literature a systematic module development that encourages the use of a full range of techniques as appropriate.

Case 3. Average, redundant, and terse textual presentation by computer. This instructional system, reported in military literature as an individualized system, passed all learners through an "average" reading presentation of the material to be mastered, and then tested on the presentation. Those who demonstrated mastery moved to the next average lesson; those who failed to demonstrate mastery were automatically cycled into the same material presented redundantly. A second failure resulted in a cycle through a terse presentation of the material. Failure on that presentation cycled the learner out of the computer system and into the instructor's hands. Notice that this uses one medium--print--(even though by computer) with several different strategies. Final intervention by the instructor would incorporate a second medium, with undefined strategies. These techniques are shaded in Figure 5.

Case 4. Print, audio, and slidetape versions of the same content. In this system, now being used in public and military education, the same content is presented by print medium, audiotape, and slide/tape. No variation in strategy is used in the three presentations, and the system is autoinstructional. This is shown in Figure 6, by shading.

Figure 4. Individualization Techniques in Case 2 (Modules)

Goals	Short-term
	Long-term
Performance Obj.	Match to goal
Criterion-Referenced Tests	Unit pretest
	▨ Lesson pretest
	Posttest/mastery
	Posttest/nonmastery
Media Selection	▨ Print
	Audio
	Still visual
	Human resources
	Motion visual
	Actual object
Learning Strategies	▨ Vary events
	Peer tutor
	Instructor tutor
	Advanced student tutor
	Community volunteer tutor
	Instructor pacing
	▨ Student pacing
	Instructor-student pacing
	Proctor-student pacing
	Contingency management
Learning Sequencing	Short-term goal sequence
	Objective sequence
	Lesson sequence

Goals	Short-term
	Long-term
Performance Obj.	Match to goal
Criterion-Referenced Tests	Unit pretest
	Lesson pretest
	Posttest/mastery
	Posttest/nonmastery
Media Selection	▨ Print
	Audio
	Still visual
	Human resources
	Motion visual
	Actual object
Learning Strategies	▨ Vary events
	Peer tutor
	▨ Instructor tutor
	Advanced student tutor
	Community volunteer tutor
	Instructor pacing
	Student pacing
	Instructor-student pacing
	Proctor-student pacing
	▨ Contingency management
Learning Sequencing	Short-term goal sequence
	Objective sequence
	Lesson sequence

Figure 5. Individualization Techniques in Case 3 (Average, redundant, and terse textual presentation by computer)

Figure 6. Individualization Techniques in Case 4 (Print, audio, and slide/tape versions of same content)

Goals	Short-term
	Long-term
Performance Obj.	Match to goal
Criterion-Referenced Tests	Unit pretest
	Lesson pretest
	Posttest/mastery
	Posttest/nonmastery
Media Selection	▨ Print
	▨ Audio
	▨ Still visual
	Human resources
	Motion visual
	Actual object
Learning Strategies	Vary events
	Peer tutor
	Instructor tutor
	Advanced student tutor
	Community volunteer tutor
	Instructor pacing
	Student pacing
	Instructor-student pacing
	Proctor-student pacing
	Contingency management
Learning Sequencing	Short-term goal sequence
	Objective sequence
	Lesson sequence

Case 5. Self-pacing. In a markedly large number of instances, self-pacing is used as a synonym for individualized instruction. In the model we are fieldtesting, self-pacing is not only merely one strategy, but is also only a substrategy in the set of pacing strategies. Note the minimal shading in Figure 7.

These sample cases taken from the literature give you some idea of the scope of the individualization model developed on the curriculum basis, and to the desirability of establishing some more comprehensive model through which to exchange information on individualization, to conduct research, and to develop and implement individualized instruction at an optimal level.

Now, let's take a look at some methodological details and the reported frequencies of use of these techniques in our fieldtest population.

Method

Participants. Since the participants task was to help the CDS project staff develop and diffuse guidelines for individualized instruction, we did not sample randomly from among the vocational instructors in the state. Rather, a number of practical considerations determined the choice of participants. One consideration was the need to coordinate our efforts with the diffusion of V-TECS catalogues in the state. We selected only teachers who taught subjects where V-TECS catalogues were available or would be available before the termination of our project. The diffusion role of our participants demanded teachers who worked well with other teachers as well as with the school administration.

Figure 7. Individualization Techniques in Case 5 (Self-pacing)

Goals	Short-term
	Long-term
Performance Obj.	Match to goal
Criterion-Referenced Tests	Unit pretest
	Lesson pretest
	Posttest/mastery
	Posttest/nonmastery
Media Selection	Print
	Audio
	Still visual
	Human resources
	Motion visual
	Actual object
Learning Strategies	Vary events
	Peer tutor
	Instructor tutor
	Advanced student tutor
	Community volunteer tutor
	Instructor pacing
	▨ Student pacing
	Instructor-student pacing
	Proctor-student pacing
	Contingency management
Learning Sequencing	Short-term goal sequence
	Objective sequence
	Lesson sequence

To help assure obtaining such teachers, we sought recommendations from school principals or directors and all vocational teachers from the sampled schools. Finally we wanted to work with teachers who expressed favorable attitudes toward individualized instruction, were flexible and innovative. We therefore selected only those teachers with positive scores on questionnaires designed to assess attitudes toward individualized instruction and flexibility. Principal and peer nominations were sought as an index of innovativeness. The developmental role of our teachers required teachers who were innovative, flexible, and positively inclined toward individualized instruction.[6]

From among the roughly 1500 vocational instructors initially surveyed, we selected 150 to interview and invite to participate in our project. We selected two groups of 25 teachers from among those who said they would like to participate. These 50 instructors represented the best allotment of 50 instructors into two groups of 25 that could be obtained given the following criteria: We wanted one, approximately equal numbers in each group from each of 7 counties; two, approximately the same number of males and females in each group; three; the broadest range of vocational areas in each group while matching areas as best as possible; and four, to have only teachers in the same group in the same school.

In Group 1 there were 11 males and 14 females. Of the 25 Group 1 instructors, 8 taught in at least one area of business education, 3 were in auto mechanics, 2 each in health occupations, horticulture, clothing construction, distributive education, and building trades, and 1 each in machine operator, electronics, cooking, and data processing. In Group 2 there were 9 males and 16 females. There were 12 in the business area, 5 in child care, 3 in distributive education, and 1 each in electronics, building trades, cooking, and clothing construction.

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[6] Details of the selection procedure may be obtained by writing to Project Director, CDS Project, 415 N. Monroe St., Tallahassee, FL 32306.

Materials. Several types of data have been collected as part of the evaluation of our project activities. In this report we will deal with only one type, that obtained from a teacher self-recording form. Appendix A contains an example of the observation form, explanation sheet, and glossary. The instructions for recording were modified slightly after the first six weeks. The data to be reported are from a four-week period beginning immediately after the change in recording was instituted. Thus, each teacher was asked to use one column of the form for each day of the week. In the appropriate row they were to place a check mark if the individualization technique represented was used at least once on that day. At the end of each week the teachers sent in that week's recordings.

Procedures. Our primary interest was the development of guidelines for individualized instruction in vocational education. For this reason, comparisons between groups are of minimal interest. The roles of the teachers in Groups 1 and 2 were the same, to help us develop individualization guidelines. However, each group had slightly different tasks. Group 1 teachers attended a one-day workshop in August 1975 prior to the beginning of the school year. During the workshop the teachers gave the project staff evaluative feedback on a preliminary set of guidelines which they had received about two weeks prior to the workshop. They were also given two hours instruction in the use of the recording form, which included definition of terms and examples of the types of behaviors that were to be recorded. A second one-day workshop was held in October 1975, the purpose of which was to obtain feedback on a revision of the preliminary guidelines. From September through December 1975 these teachers recorded their individualization behaviors each day and sent in their recordings at the end of each week. During this period the teachers were encouraged to emplement as much as possible the guidelines for individualized instruction.

Group 2 teachers did not attend a workshop until December 1975. Their primary duties were to record their teaching behaviors on the same self-recording form used by Group 1 teachers. Group 2 teachers received two hours instruction in the proper use of the recording form. The purpose of the Group 2 observations was to establish a baseline of individualization behaviors uninfluenced by the CDS project guidelines. The December workshop allowed Group 2 teachers to give us feedback on the second revision of the guidelines. The self-recording observations in both groups will guide further revisions of the individualization guidelines by showing which techniques are used less often. By using the teachers' individualization profile as a point of departure, we can discover what it is about the teacher, their subject matter, or their resources that prevents or inhibits the use of some techniques and encourages the use of others.

Results

The following results are descriptive in nature; they apply only to the two groups of participants. We do not intend to generalize or make inferences, about other groups of teachers, based on these results.

As illustrated in Table 1, the CDS project individualization guidelines are composed of 26 techniques or strategies. Our results[7] for the data collected during the 18 school days in the month of November (1975) show that Group 1 teachers used[8] an average of 12.4 techniques _at least_ once. The standard deviation was 4.3 techniques for Group 1 teachers. Group 2 teachers used an average of 12.6 techniques _at least_ once, with a standard deviation of 6.2 techniques. Figure 8 shows the number of Group 1 and 2 teachers that fall into various classes of the number of different techniques used at least once. The majority of teachers reported using between 6 and 20 techniques.

Figures 9 and 10 illustrate how frequently each individualization technique was used. Varying print media and instructor tutoring were the most frequently reported techniques for Group 1 instructors; both techniques were used on more than 50% of the days. In Group 2 only instructor tutoring exceeded 50% of the days. Techniques reported on less than 10% of the days by Group 1 were unit and lesson pretesting, varying human resources, advanced student and community volunteer tutoring, proctor-student pacing, contingency management, and short-term goal

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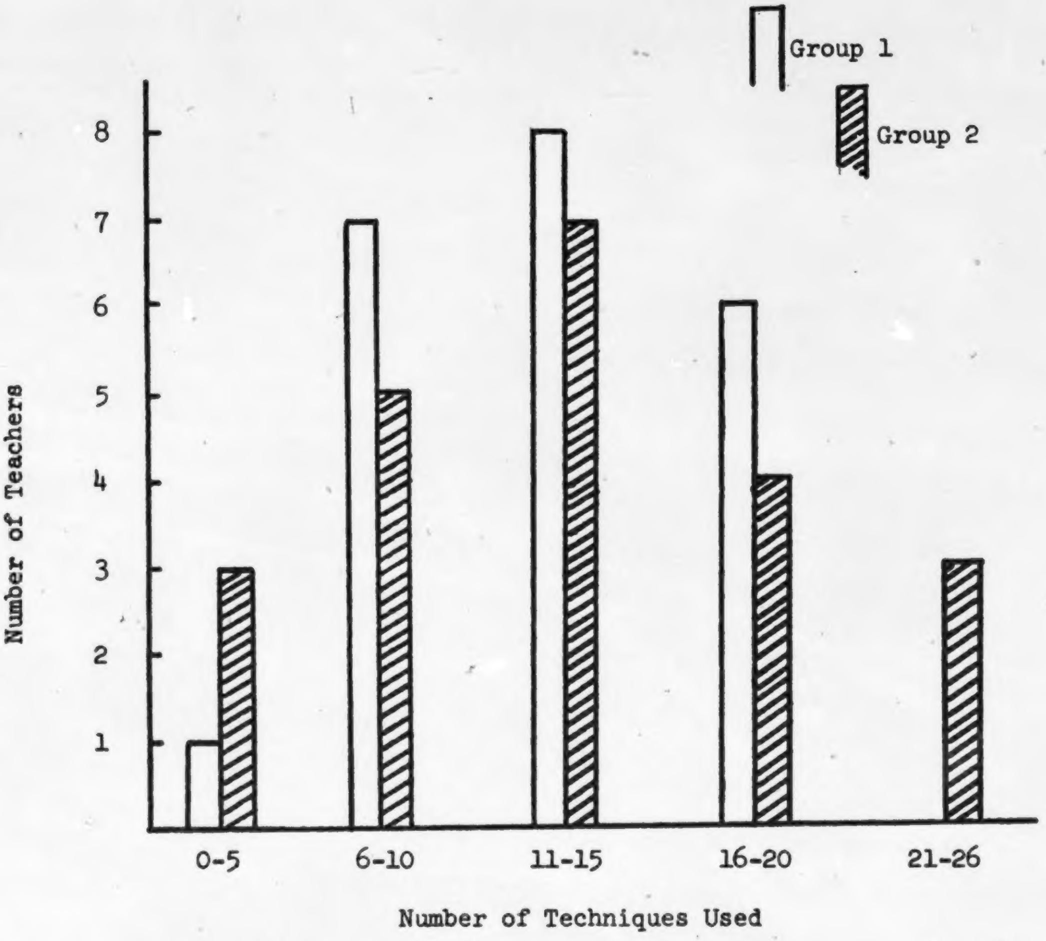
[7] These results are based on 22 Group 1 and 22 Group 2 teachers.

[8] By "used" we mean "reported using" on the self-recording observation form in Appendix A.

Figure 8. Number of Different Techniques Used By Group 1 and 2 Teachers



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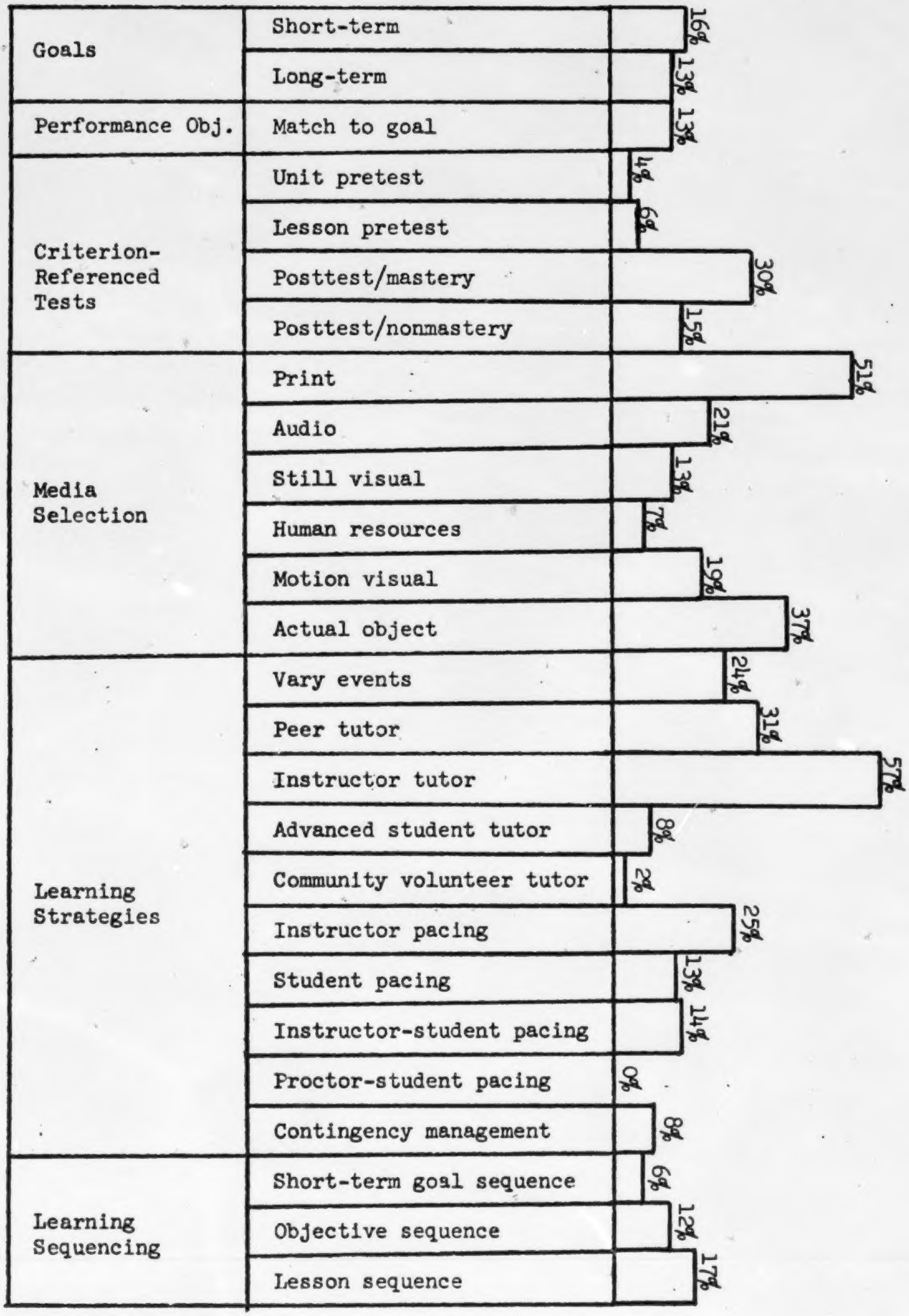

Figure 9. Percentage of days on which a technique was used by Group 1 teachers (Total days for all teachers combined = 330 days)

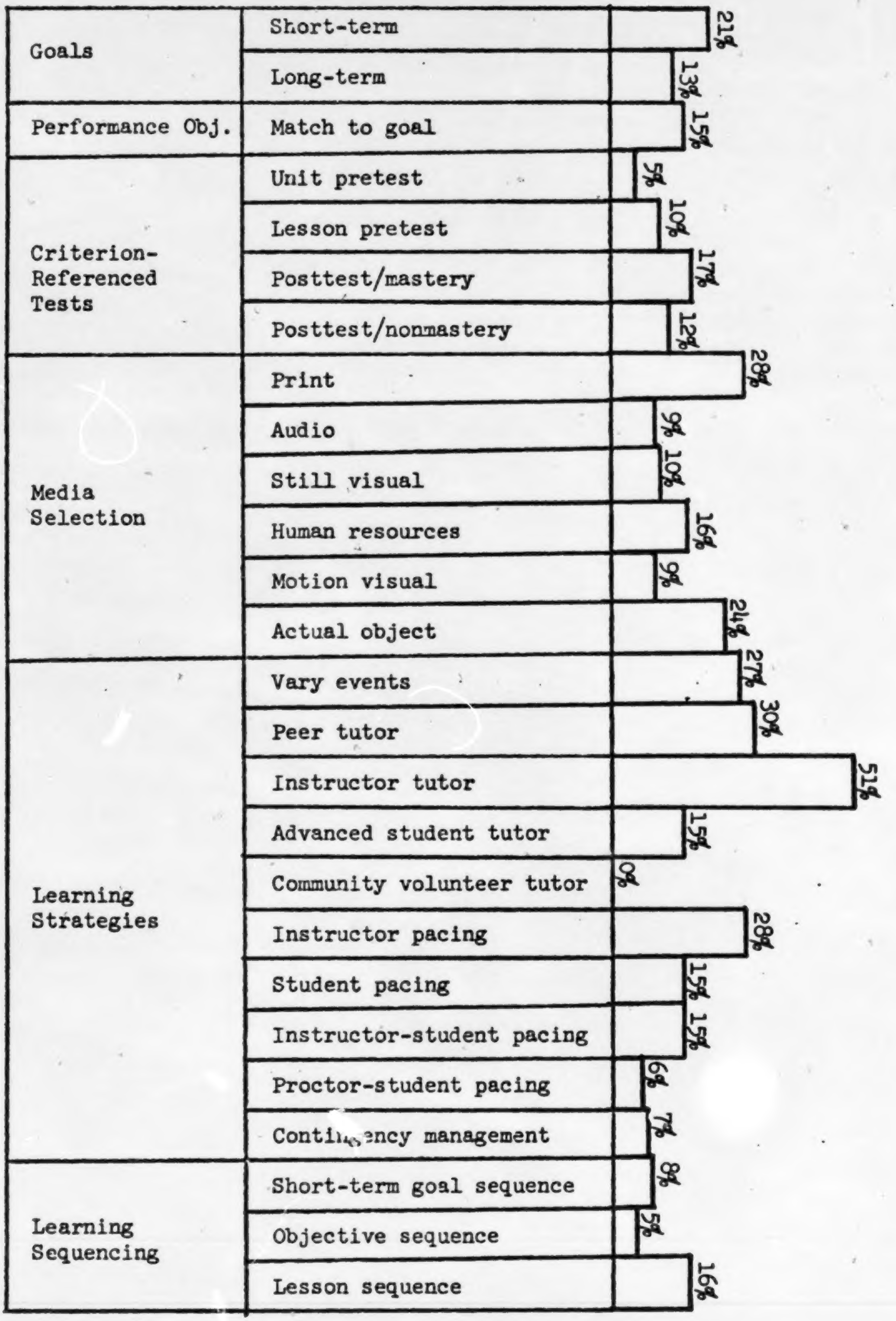

Figure 10. Percentage of days on which a technique was used by Group 2 teachers (Total days for all teachers combined = 385 days)

sequencing. Group 2 reported using the following techniques on less than 10% of the days: unit pretesting, varying audio and motion visual media, community volunteer tutoring, proctor-student pacing, contingency management and short-term goal and objective sequencing. In general, the patterns of technique use in the two groups are remarkably similar.

The ranges of daily technique use percentages are shown in Figure 11 for Group 1 and in Figure 12 for Group 2. In general, more techniques were used on 100% of the days in Group 1 than in Group 2. In both groups the most frequent lower limit was 5% of the days.[9] Community volunteer tutoring and proctor-student pacing exhibited the smallest ranges in both groups. These small ranges are consistent with the overall percentages reported in Figures 9 and 10. On the other hand, the upper limits bear no systematic relationship to the overall percentages.

As a further indication of the extent to which the various individualization techniques were used, the percentage of teachers using each technique appears in Figures 13 and 14. Figure 13 shows that 14 of the 26 techniques were used by 50% or more of the Group 1 teachers. Thirteen techniques were used by 50% or more of the Group 2 teachers (see Figure 14). Only unit pretesting and proctor-student pacing were used by less than 10% of the Group 1 teachers. In Group 2 community volunteer tutoring was the only technique used by less than 10% of the teachers. The percentage of teachers using each technique was less variable in Group 2 than in Group 1.

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[9] These data include only those teachers who used a given technique at least once.

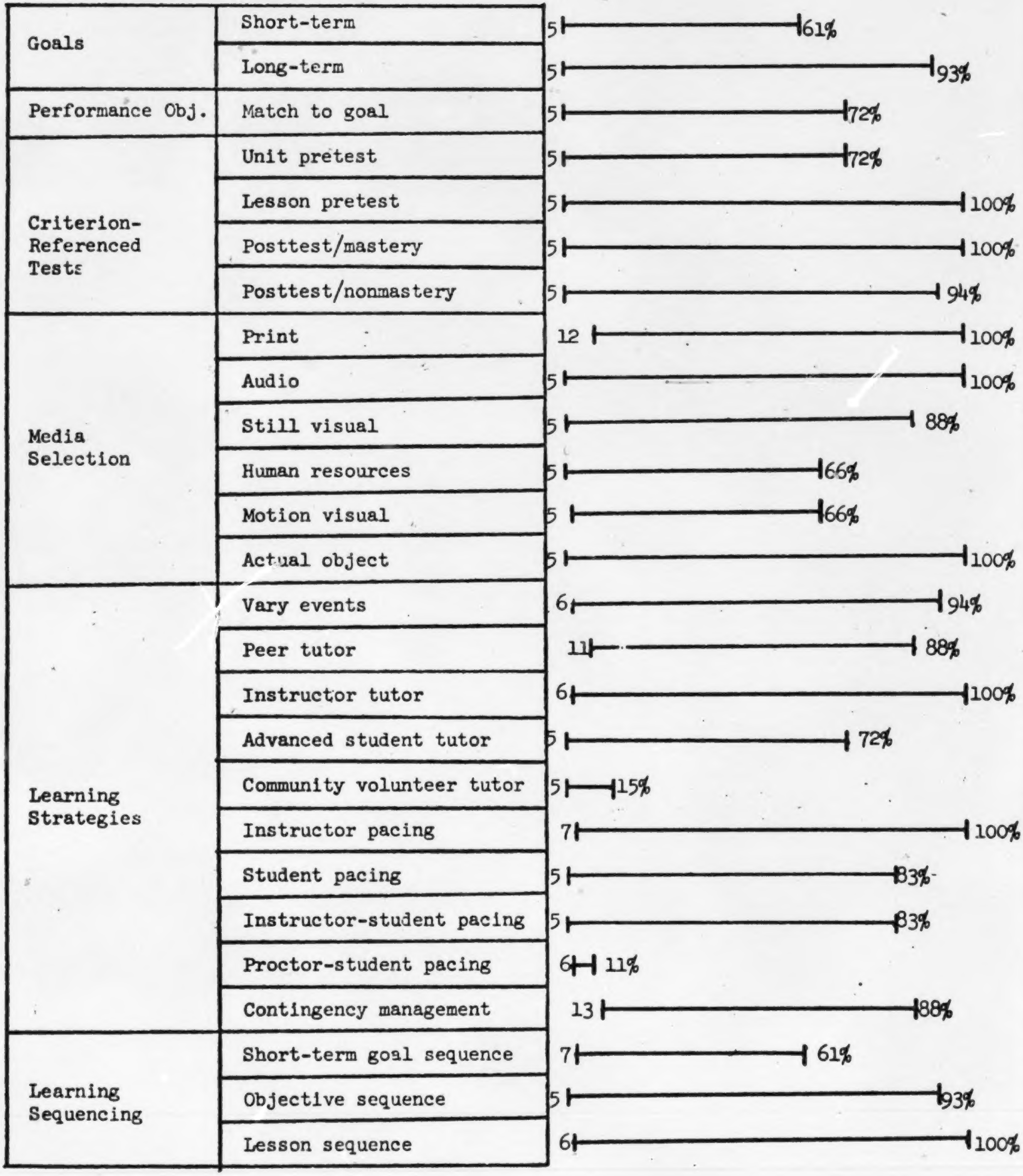
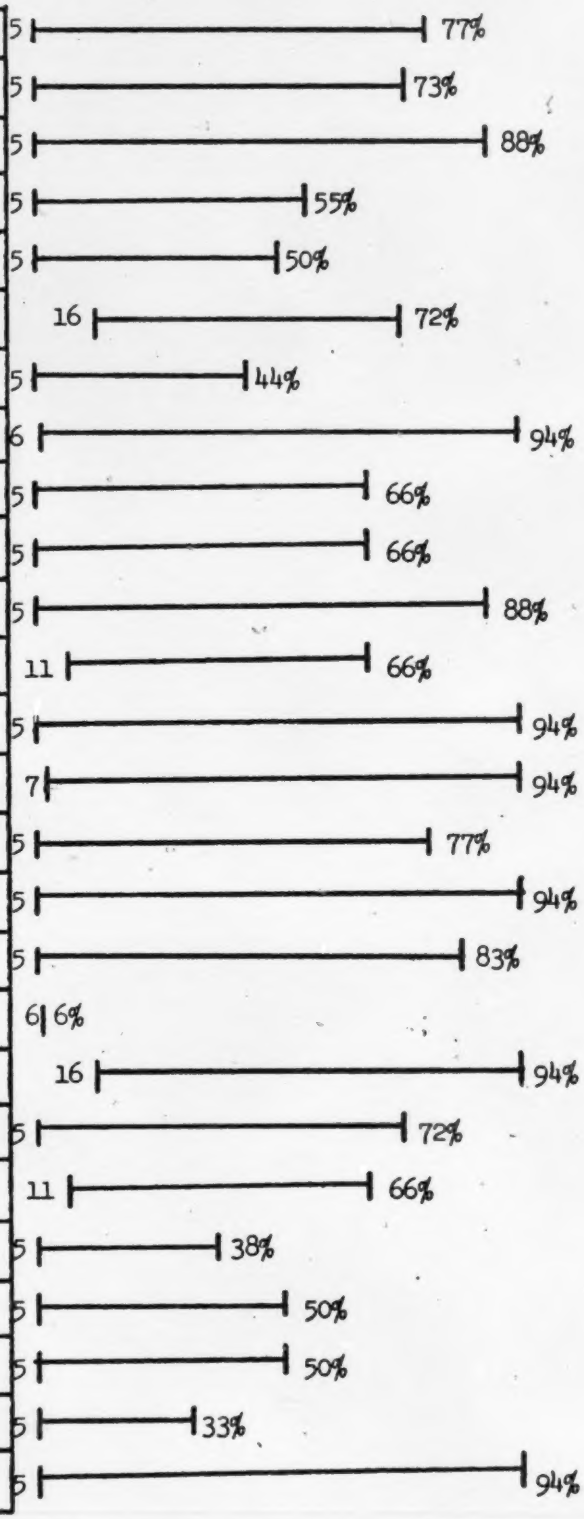


Figure 11. Range of Group 1 teacher's daily technique use percentages



Goals	Short-term	5	77%
	Long-term	5	73%
Performance Obj.	Match to goal	5	88%
Criterion-Referenced Tests	Unit pretest	5	55%
	Lesson pretest	5	50%
	Posttest/mastery	16	72%
	Posttest/nonmastery	5	44%
Media Selection	Print	6	94%
	Audio	5	66%
	Still visual	5	66%
	Human resources	5	88%
	Motion visual	11	66%
	Actual object	5	94%
Learning Strategies	Vary events	7	94%
	Peer tutor	5	77%
	Instructor tutor	5	94%
	Advanced student tutor	5	83%
	Community volunteer tutor	6	6%
	Instructor pacing	16	94%
	Student pacing	5	72%
	Instructor-student pacing	11	66%
	Proctor-student pacing	5	38%
	Contingency management	5	50%
Learning Sequencing	Short-term goal sequence	5	50%
	Objective sequence	5	33%
	Lesson sequence	5	94%

Figure 12. Range of Group 2 teacher's daily technique use percentages

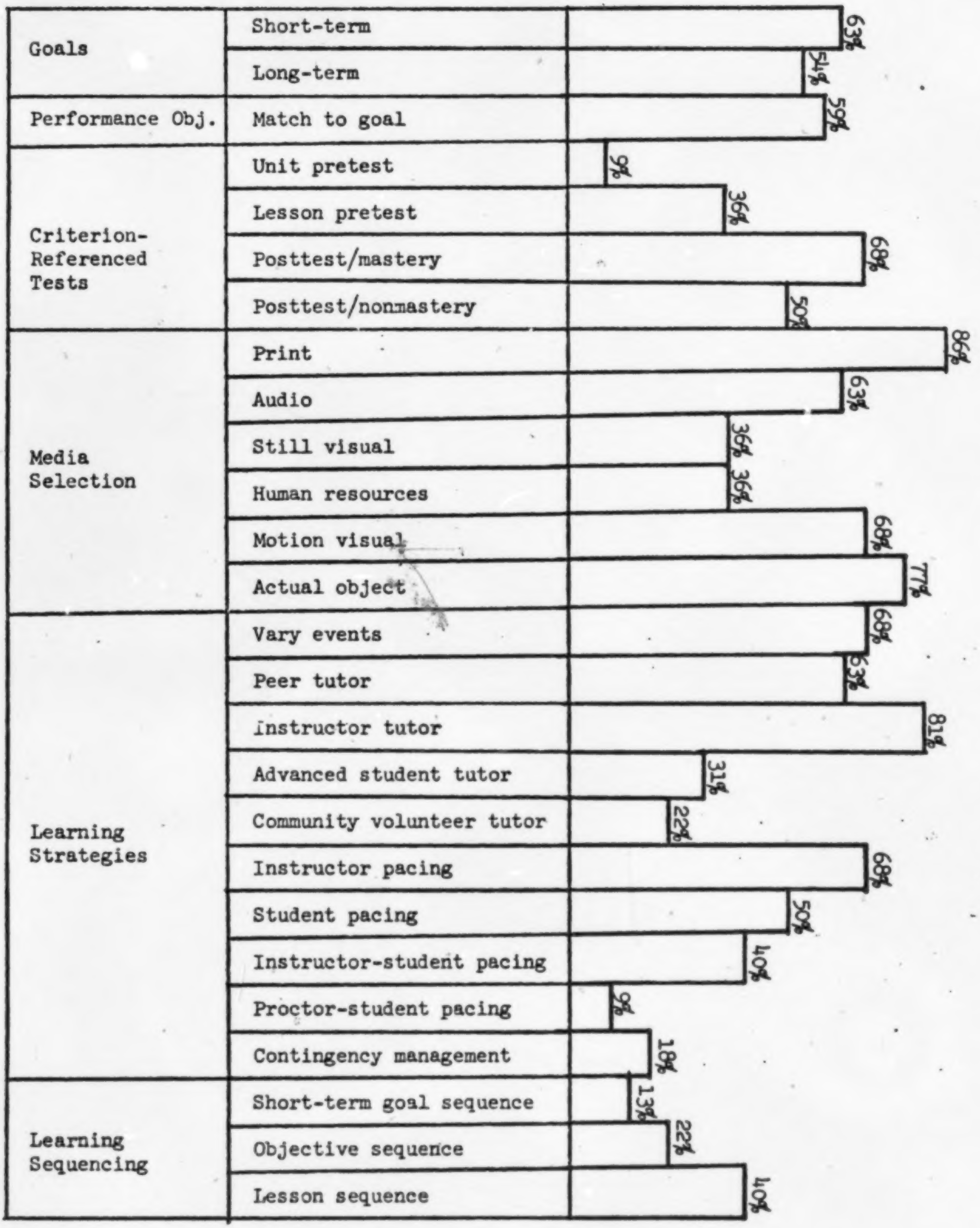


Figure 13. Percentage of Group 1 teachers using each technique

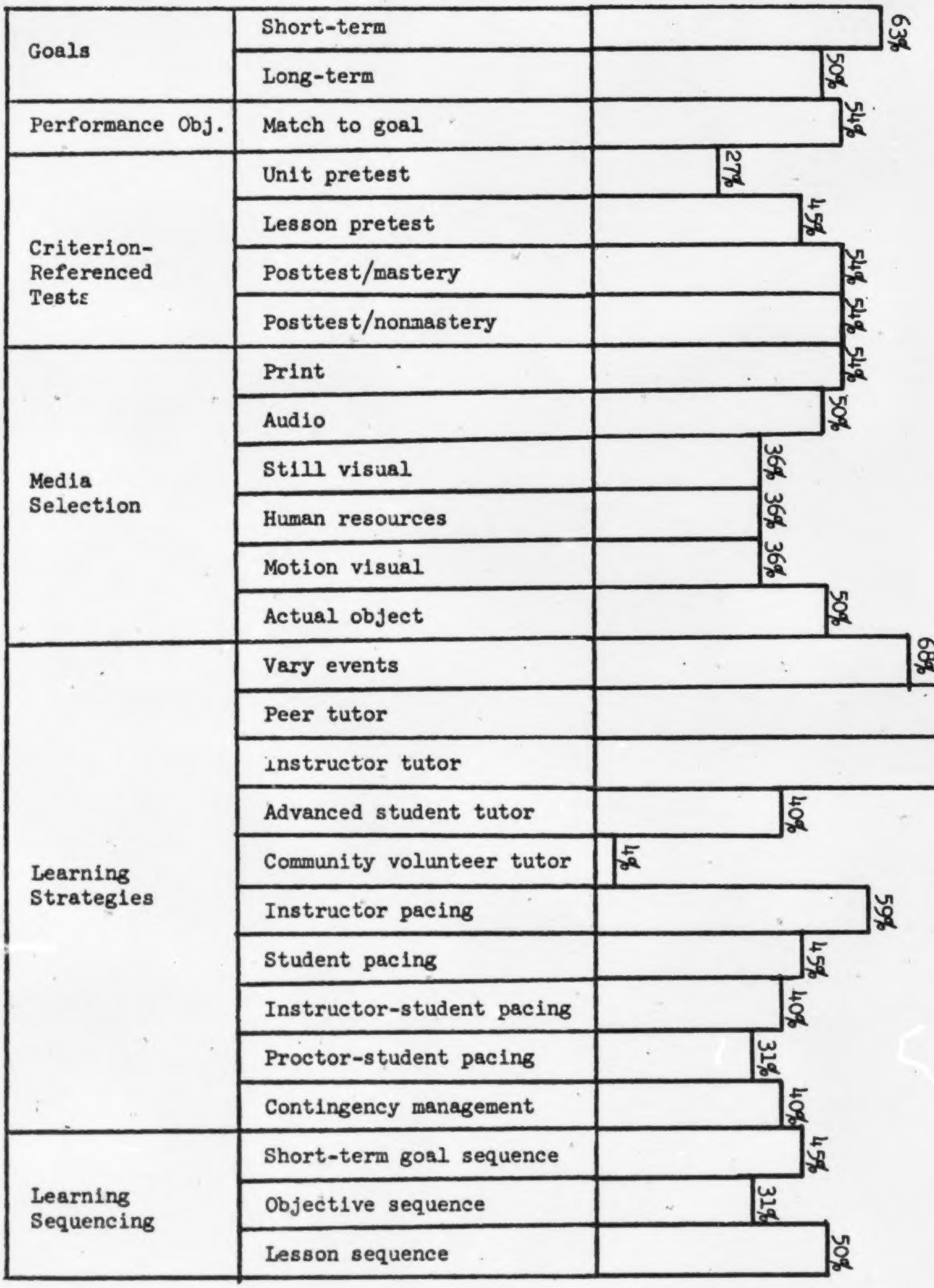


Figure 14. Percentage of Group 2 teachers using each technique

Discussion

It is apparent from the data just presented that our two groups of participants varied only slightly on the extent of individualization technique use. These minimal differences are in line with our expectations but contrary to our hopes. It would have been pleasing to find Group 1 teachers using a wide range of individualization techniques as a result of having read, reviewed, and critiqued the guidelines for individualized instruction. Even with the high degree of "ego-involvement" that our Group 1 teachers expressed, it appears to take more than merely asking teachers to implement a radically different approach to individualization to get them to do it. Our efforts in the future will be directed toward inservice and preservice training as an approach to diffusing a comprehensive approach to individualization.

In the introduction to this paper we illustrated several approaches to individualization, by indicating which techniques were minimally required by each approach. The number of techniques illustrated varied from one in the self-pacing approach to four with modular instruction and variation of text. Our participants were generally more eclectic in their approach to individualization. On the average, teachers in both groups used about 12 techniques. The largest number used by any one teacher was 23, the least was 2. This data and that appearing in Figures 9, 10, 11, 12, 13, and 14 indicate a somewhat broader conception of individualization then those depicted in Cases 1 through 5 in the introduction. We are now attempting to find out what factors determine or influence the range of techniques a teacher uses. Does the nature of the student population exert a significant influence? What characteristics of the vocational or subject matter area are important? How much influence does the lack, or abundance, of resources have on the extent of individualization? What teacher background variables are important? These questions and those dealing with interactions among these variables are important to the diffusion of any educational innovation.

APPENDIX Q

INDIVIDUALIZED INSTRUCTION: A CRITICAL LINK IN REALIZING COMPETENCY-BASED VOCATIONAL EDUCATION

C. TRACY HARRINGTON

Individualized Instruction: A Critical Link in Realizing Competency-Based Vocational Education

C. Tracy Harrington

As vocational education in Florida moves to a competency-based approach, it is also moving, inevitably, towards individualized instruction, for the two are inseparably linked. In competency-based education, the emphasis is on attaining clear-cut, measurable competencies -not on spending two years in a course, or getting a passing grade, or any of the other conventional standards for evaluating a student's progress. Since competency-based vocational education focuses on providing every learner with the specific skills and knowledge needed to obtain and hold a job, and since individuals differ in how they learn, instruction must be varied to help individuals master the competencies they set out to acquire.

Florida's educational leaders recognized early that competency-based vocational education requires individualized instruction. As a result, the Division of Vocational Education requested and received federal support for a special project, which has become known as the Curriculum Delivery System (CDS) Project for Individualizing Vocational Education in Florida.

Since the project began in August, 1974, the CDS project staff has worked on two major tasks. The first of these was to develop a descriptive framework paper spelling out exactly what individualized instruction in the vocational setting involves. The second task was to prepare guidelines or procedures to help teachers individualize their instruction.

In accomplishing the first task, the project staff visited and observed individualization in action in various vocational classrooms in Florida and elsewhere. They also examined thousands of reports and articles dealing with individualized instruction. Within a year, and with the help of both state

Individualized instruction really means adjusting or altering instruction as often as necessary and in whatever ways needed to help individuals master the competencies that they set out to acquire.

and national experts, the project staff had produced a theoretical framework paper for individualizing vocational education. In this framework paper, the bases for individualizing were described in terms of the major components of the vocational curriculum: vocational goal setting, performance objectives and criterion-referenced testing, learning experiences, learning strategies, learning organization, and evaluation.

One important outcome of the theoretical framework was a picture of individualized instruction as something a great deal more than programmed instruction, learning activity packages, self-pacing, autoinstruction, or even modularized curricula. Ask any five or six educators-on-the-street what individualized instruction is, and they are likely to equate it with one of these. What the CDS project staff discovered was that while any of these techniques could be used to individualize instruction, none of them told the whole story.

Individualized instruction really means adjusting or altering instruction as often as necessary and in whatever ways needed to help individuals master the competencies that they set out to acquire. While this perspective is certainly comprehensive, in itself it is too abstract to be of much practical value. While it explains the concept of individualization, it doesn't help to operationalize it. So this was the problem which faced the CDS staff: how to maintain a broadly conceived view of individualization and, at the same time, to translate that view into concrete practices that would be of use to vocational teachers.

In reviewing the literature on individualization and in observing individualization in Florida classrooms, the staff came up with a set of strategies for individualizing. Turning again to the curriculum components–goals, objectives and criterion-referenced tests, learning experiences, learning strategies, learning organization, and evaluation–the CDS staff found that the strategies fit very neatly into the curriculum framework. For example, certain strategies could be used for goal setting while others were appropriate for providing learning experiences, learning organization, or evaluation.

Thus, there was a basis for developing procedural manuals that teachers could use to learn how to incorporate individualization into their curriculum. It was also important to find out how teachers, systematically identified as receptive to individualization, would make use of these strategies in their classrooms. With a focus on these two needs, the CDS staff launched two activities to accomplish the second project task.

First, the staff designed procedures for selecting a group of vocational teachers strongly inclined towards individualization. The plan was to pick 50 teachers who fit this description and to use their talents and experience in developing the manuals. In addition, the CDS staff would observe these teachers to discover to what extent they made use of the strategies for individualizing that had been identified. From a group of 1,500 teachers in 7 Florida counties, 50 teachers who were willing to supply information on their individualization activities were chosen to work with the staff in developing the manuals.

Since August, 1975, these 50 teachers have been directly involved in shaping the procedural manuals and have also been systematically recording their use of individualization strategies. The information the teachers have been supplying to the CDS project will give a clear picture of what techniques are being used, which ones are underused, and whether there are obstacles to increasing the array of individualization strategies individual teachers employ. The records of individualization will also point out whether teachers in certain fields tend to use only certain strategies and whether particular strategies appear to be inappropriate for specific teaching fields.

Secondly, as the teachers were being selected, the staff developed a first draft of the procedural manuals for teachers to use in individualizing. These first drafts were submitted to half of the 50 teachers in August, 1975. Based on the teachers' suggestions, the manuals were revised and resubmitted to the same teachers for a second critique. Following this critique, a third version of the manuals was written.

This third version is now being used and reviewed by all fifty of the participating teachers. While some changes based on the teachers' responses to this latest version will be made, the overall content and format of the manuals have been established.

There are five manuals each of which describes the strategies available for individualizing, examples of their application, and techniques for developing and using them. Briefly, the manuals are structured like this:

1. *Goals.* This manual treats the problems of helping entering students set realistic vocational goals for themselves. It also covers approaches for assisting enrolled students to change vocational goals they have found to be inappropriate. The manual discusses collecting and evaluating goal-related information on the student, on the prospective vocational goal, and on the job market. It also includes information on sequencing short-term goals to meet individual needs. Throughout the manual are examples of common goal-setting problems and how they have been solved by practicing teachers.

2. *Objectives and Criterion-Referenced Tests.* Performance objectives and criterion-referenced tests are critical to any effort to bring about individualized, competency-based vocational education. This manual explains the relationship between objectives and test items as well as providing techniques for using objectives and tests to individualize. Additionally, it describes the validation of existing course objectives using the Vocational-Technical Education Consortium of States (V-TECS) or other catalogs of objectives based on occupational surveys. The manual also covers analyzing performance objectives as the first step in developing learning experiences and in writing criterion-referenced tests for performance objectives. Again, examples of vocational teachers using objectives and testing techniques to individualize are presented.

3. *Learning Experiences.* The learning experiences manual introduces the use of instructional media to meet individual needs and preferences. It offers teachers a media selection model based on the degree of control that the learner has over each kind of medium and the cost of the medium. In addition to discussing the bases for selecting media and the characteristics of all types of media, the manual presents examples of how varying media can meet individual needs. Finally, the learning experiences manual explains how to review, select, and/or adapt existing instructional materials to meet individual needs.

4. *Learning Strategies.* This manual describes the array of instructional strategies available to the teacher as a way of increasing the amount of individualized instruction s(he) provides. For example, strategies such as increasing or decreasing structure, changing language, or programming may be used to further individualize an already developed learning experience. The manual also examines the use of behavioral modification techniques in individualized settings, the use of various pacing options, and the several kinds of tutoring that can be used. In each case, it includes examples and techniques for both the development and the operation of tutoring, pacing, and behavior modification programs for individualizing.

5. *Learning Evaluation.* The final manual deals with the evaluation of individualized instruction by the teacher. The evaluation manual illustrates how teachers can assess the effectiveness and appropriateness of the instruction they design for the individual.

The final set of procedural manuals for individualizing instruction produced by the staff will be teacher-based and teacher-verified. In other words, experienced teachers will have had a hand in developing procedural manuals that, in their best judgement, meet a practical need of Florida's vocational teachers.

The CDS staff expects to have these procedural manuals completed by June, 1976. Currently, plans for disseminating these manuals to teachers and possibly turning the manuals into a course for inservice and preservice teachers are being developed. When the manuals are finally delivered to Florida's vocational teachers, they will constitute a critical link between the state commitment to a competency-based approach and the realization of a competency-based vocational education system in Florida.

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